DOCUMENT RESUME

ED 175 992 UD 019 818

AUTHOR	Duncan, Greg J., Ed.; Morgan, James N., Ed.
TITLE	Five Thousand American Families--Patterns of Economic Progress. Volume VII.
INSTITUTION	Michigan Univ., Ann Arbor. Inst. for Social Research.
SPONS AGENCY	Department of Health, Education, and Welfare, Washington, D.C. Office of the Assistant Secretary for Planning and Evaluation.
PUB DATE	79
NOTE	386p.; For related documents, see ED 088 765-766 and ED 167 653-656; Not available in paper copy due to the print size of the original document
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Data; Economically Disadvantaged; *Economic Status; Family (Sociological Unit); Family Income; Heads of Households; *Income; *Occupational Information; *Parental Background; Social Science Research; Unemployment; Wages; *Welfare; Welfare Recipients; Work Experience; *Working Hours
IDENTIFIERS	*Panel Study of Income Dynamics

ABSTRACT

The chapters in this volume summarize and analyze the first ten years of data of the Panel Study of Income Dynamics. Mary Corcoran and Martha Hill analyzed the economic burden of unemployment among heads of households. James Morgan takes various methodological approaches in studying the determinants of the number of work hours of male heads of households and of changes in work hours. Greg Duncan proposes an empirical model of wage change. Richard Coe analyzes the determinants of food stamp use among the poor. Mary Corcoran investigates the measurement error in models of status attainment which include as predictors young men's reports about the status of their parents. Martha Hill and James Morgan focus on dimensions of occupation and describe the component characteristics of jobs and workers on those jobs and the uneven way in which the usual occupation code represent them. In addition, research going on outside the Survey Research Center using Panel Study data is summarized. A copy of the questionnaire used in the 1977 phase of the Panel Study is included. (Author/EB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED175992

FIVE THOUSAND AMERICAN FAMILIES—

PATTERNS OF ECONOMIC PROGRESS

VOLUME VII

Analyses of the First Ten Years of the Panel Study of Income Dynamics

Edited by Greg J. Duncan and James N. Morgan

With Contributions by Richard D. Coe, Mary Corcoran,
Greg J. Duncan, Martha S. Hill, and James N. Morgan

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY
P Hildebrandt
ISR – Survey Research
Center
TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Conducted Under Contracts with the Office of Economic Opportunity
(Responsibility for this project has been transferred to the Office of the
Assistant Secretary for Planning and Evaluation, Department of
Health, Education, and Welfare)

UD019818

ISR
SURVEY RESEARCH CENTER
INSTITUTE FOR SOCIAL RESEARCH
THE UNIVERSITY OF MICHIGAN

ISR Code No. 4130

Permission is hereby granted for the quotation of this publication without prior specific permission for purposes of criticism, review, or evaluation, subject only to the "fair use" provisions of the Resolution on Permissions of the Association of American University Presses, including citation of the source.

Five Thousand American Families—Patterns of Economic Progress, Volume VII
Library of Congress Catalog Card No. 74-62002
ISBN 0-87944-233-6 paperbound
ISBN 0-87944-234-4 clothbound

Published by the Institute for Social Research
The University of Michigan, Ann Arbor, Michigan

Published 1979
Printed in the United States of America

CONTENTS

Introduction		vii
Chapter 1	THE INCIDENCE AND CONSEQUENCES OF SHORT- AND LONG-RUN UNEMPLOYMENT *Mary Corcoran and Martha S. Hill*	1
Chapter 2	HOURS OF WORK BY FAMILY HEADS: CONSTRAINTS, MARGINAL CHOICES, AND INCOME GOALS *James N. Morgan*	65
Chapter 3	AN EMPIRICAL MODEL OF WAGE GROWTH *Greg J. Duncan*	101
Chapter 4	PARTICIPATION IN THE FOOD STAMP PROGRAM AMONG THE POVERTY POPULATION, 1976 *Richard D. Coe*	143
Chapter 5	AN EXAMINATION OF THE DYNAMICS OF FOOD STAMP USE *Richard D. Coe*	183
Chapter 6	MEASUREMENT ERROR IN STATUS ATTAINMENT MODELS *Mary Corcoran*	269
Chapter 7	DIMENSIONS OF OCCUPATION *Martha Hill and James N. Morgan*	293
Chapter 8	SUMMARY OF OTHER RESEARCH	335
Appendix A	1977 QUESTIONNAIRE	355
Glossary		373

INTRODUCTION TO VOLUME VII

The previous volumes in the Five Thousand American Families series have been composed of two parts: a set of chapters organized around a common theme and additional chapters related only by the common data base. Each volume has also included a chapter which summarizes work done with the data by those outside the Survey Research Center, so far as we are able to keep in touch with it.

In Volume VII, we present chapters which have little relation to one another, although most of them update and expand work presented in earlier volumes. The chapters in this volume are generally longer than journal articles and contain much more basic, descriptive information than would appear in journals. The data are very rich and cannot be summarized easily in a small set of multiple regressions. By addressing many subjects in this way, we seek to provide the basic information from the data that can be of direct use to others as well as to data analysts outside The University of Michigan who are interested in using the Panel Study data in their own secondary analyses.

An additional feature of the chapters in this and past volumes is that they document alternative methodological approaches to the analysis of longitudinal data, some of which are successful and some of which are not. In presenting the failures along with the successes, we hope to contribute to the growing body of methodological work done on panel data. We find that answers from longitudinal analysis often conflict with those from cross-sectional analysis and we believe that consistency between the two approaches is crucial before much confidence can be placed in any causal model.

In the first chapter, Mary Corcoran and Martha Hill analyze the economic burden of unemployment among heads of households. The topics they cover include the incidence of unemployment during 1976 and the ten-year period 1967-1976, the relationship between unemployment and poverty, and the role of unemployment compensation in alleviating the economic burden of unemployment. Consistent with the results of data analysis from the first five years (presented in Chapter 3, Volume I) they report that unemployment contributes to the incidence of poverty but is clearly not a major cause of it and that unemployment during a one year period hits blacks and the young especially hard. About half of the household heads unemployed in 1976 report receiving some unemployment compensation and such compensation replaced only about half of the earnings lost from unemployment. The unemployment burden for household heads is found to be highly concentrated, even among prime-age male household heads continuing in the labor force during the 1967-1976 period. About five percent of these men account for about half of the ten-year total unemployment hours of this group.

In the second chapter, James Morgan takes various methodological approaches in studying the determinants of the number of work hours of male heads of households and of changes in work hours. He rejects the simple utility maximization model of labor supply in favor of a model in which goals for income and constraints on work hours dominate the changes in hours of work. He also finds that immediate short-run effects of wages on hours are greater than their longer-run effects--people get accustomed to higher real wages.

Longitudinal data on the labor force experience of household heads provide a unique opportunity to study the determinants of wage changes. An empirical model of wage change is proposed and estimated by Greg Duncan in the third chapter. The wage growth of black and white men are found to be affected by a common set of factors, with institutional changes such as moving into or out of a union being the most important. It also appears that the well-documented growth in the wages of southern blacks is based, in part, on their increased entry into union jobs.

It is puzzling that fewer than half of the poor families in the United States participate in the food stamp program, since virtually all of them are eligible to do so. In Chapter 4, Richard Coe analyzes the determinants of food stamp use among the poor in 1976. He expands his previous work (Volume V, Chapter 8) by including information from nonparticipants on their reasons for not participating in the program. It is found that the dominant reason for the low participation rate of the poor is that many do not believe that they are eligible to use the stamps.

In Chapter 5 Coe looks at the use of food stamps over a four-year period, 1973 to 1976. He discovers considerable turnover in the population of food stamp users, a fact which is obscured by the relatively constant aggregate participation rate. This finding leads to the examination of two related questions: (1) What determines whether a nonparticipating household begins to use food stamps? (2) What determines whether a participating household stops using the stamps? The same factors are found to effect both types of change in food stamp use, with a household's connection to the AFDC system being the most crucial. Other important factors are the presence of children, especially preschool children, in the household and whether the family is headed by a woman. These findings are consistent with and reinforce the cross-sectional findings discussed in Chapter 4.

A unique feature of the Panel Study data is that following children as they leave home provides information from a sample of young adult respondents which can be matched with information about and reported by their parents. These data have been used by Mary Corcoran in the sixth chapter to investigate measurement error in models of status attainment which include as predictors young men's reports about characteristics of their parents. She finds retrospective reports of parental status are less reliable than parents' reports of their own status and that failing to adjust for errors in retrospective reports can lead to a considerable understatement of the effects of parental traits on status.

Another methodological as well as substantive contribution is the seventh chapter by Martha Hill and James Morgan on dimensions of occupation. This chapter describes the component characteristics of jobs and workers in those jobs and the uneven way in which the usual occupation code represents them. Inferences drawn by other researchers from relationships between occupation and earnings should be clarified and perhaps made more circumspect by this background information on occupation.

As in past volumes, we also present a summary of research going on outside the Survey Research Center using Panel Study data. Some 60 institutions have received copies of this data in the past two years so our summary is probably incomplete. We attempt to contact as many users as possible and appreciate unsolicited additions to our list.

Also, as in previous volumes, we reproduce the questionnaire for our most recent wave of available data, in this case for the tenth (1977) interviewing wave. The complete sets of questionnaires and codes can be found in the documentation volumes. The questionnaire presented here is very similar to that used in waves 6, 7, and 9 and is a shortened version of the questionnaire administered during the first five years. The eleventh wave questionnaire, which will be the basis for Volume VIII, contains special sequences on how family heads got their first and present jobs and husbands' reports on how wives got their jobs with present employers. It also contains questions on pension coverage and retirement--expected or actual--and more data on disabilities of all family members. The twelfth wave questionnaire, which will be administered in the spring of 1979, will replace those special items with questions on home production, i.e., such do-it-yourself activities as repairs to house or car.

These questions were asked in the first five waves but were then dropped.

We are fortunate in having Dr. Linda Datcher join us from the Massachusetts Institute of Technology, and also welcome a new secretary, Peg Gunnesch. To our regret, we have lost Beverly Harris to the World Fertility Study in London. Otherwise our study staff is unchanged.

The chapters in this volume benefitted considerably from suggestions from our editor, Linda Stafford, and from the following reviewers:

Mary Jo Bane, Harvard University
Matthew Black, Mathematica Policy Research
Barbara Devaney, Johns Hopkins University
O. D. Duncan, University of Arizona
David Featherman, Center for Advanced Study in the Behavioral Sciences
Marianne Ferber, University of ILlinois
Robert Ferber, University of Illinois
Patricia Gurin, Institute for Social Research, University of Michigan
Saul Hoffman, University of Delaware
John Holmes, EXXON Corporation
Christopher Jencks, Harvard University
George Katona, Institute for Social Research, University of Michigan
William Mason, University of Michigan
Michael Olnick, University of Wisconsin
Paul Siegel, University of Michigan

Chapter 1

THE INCIDENCE AND CONSEQUENCES OF SHORT- AND LONG-RUN UNEMPLOYMENT

Mary Corcoran and Martha S. Hill

The Great Depression of the 1930s, when the unemployment rate averaged 17.2 percent,[1] dramatized the devastating effect of severe unemployment. Although the unemployment rate has not approached such high levels since, during the 1970s it has hovered in the range of about 5 to 9 percent, above the level defining "full employment."[2] This recent unemployment, no doubt, has also been accompanied by economic costs. To plan policies which deal effectively with these costs, knowledge is needed about their short- and long-run magnitude, about how such costs are distributed across subgroups of the population, and about the extent to which they are cushioned by existing transfer programs such as unemployment insurance.

Although work has been done on these topics, much is yet to be learned. Past research does shed light on exposure to unemployment. Barrett and Morgenstern (1974) analyzed average unemployment rates for 1964-1971 by race, age, and sex; they found higher unemployment rates for blacks, for young people, and for women. By decomposing unemployment rates into the probability of becoming unemployed and the average duration of unemployment, they showed that blacks and young people have higher unemployment rates because they are more likely to become unemployed, but that women's higher rates are due to longer average duration of unemployment. Hall (1970) also concluded that turnover is the most significant factor in the higher unemployment rates of blacks and youths, and Frank and Freeman (1978) found similar results with respect to the higher unemployment rates of young people, using 1966-1971 individual level data to estimate probabilities of transition into and out of unemployment. Dickinson (1972) restricted his analysis to male household heads and looked at unemployment over a five-year period, 1967-1971. He found that education, occupation, and the wage rate have strong effects on the extent of unemployment, that race differences in unemployment rates are, in large part, due to occupational differences, and that the probability of a man experiencing serious unemployment (which Dickinson defined as 30 or more weeks of unemployment over the five-year observation period) decreased substantially as his level of economic well-being increased. Also investigating race and economic status differences in exposure to unemployment, Gramlich (1974) examined six-year work histories of household heads for differences in the responsiveness of subgroup unemployment to changes in the aggregate level of unemployment. He found that the likelihood of being unemployed rose more rapidly with the aggregate unemployment rate among blacks and the poor than among whites and the non-poor.

---

[1] This was the average unemployment rate for the 12 years from 1930 through 1941.

[2] At least until recently, economists generally agreed that an unemployment rate of 3.5 to 4.0 percent represented a "full employment" economy.

Past research, however, sheds less light on the size or the distribution of economic losses due to unemployment, particularly as viewed from a long-run perspective. Cohen, Haber, and Mueller (1960), in a comprehensive study of the 1958 recession, examined one-year losses in some detail. They report that unemployment in 1958 resulted in income losses of $1,000 or more for at least one-third of the families experiencing unemployment or shorter work hours as a result of unemployment, and that about one-fourth of unemployed families during that year experienced income losses amounting to a third or more of their normal pretax income. Gramlich reports that the relative earnings losses of the unemployed poor (measured by lost wages as a proportion of total income) responded more strongly to changes in the aggregate unemployment rate than did the relative earnings losses of other unemployed workers. Gramlich also reports that in 1971 workers in lower income groups were much less likely to receive unemployment compensation than were workers of higher economic status, but among those who did receive unemployment compensation in 1971, lower income workers replaced a higher proportion of their lost earnings. But Gramlich did not adjust lost earnings for taxes. As Feldstein (1974) points out, unemployment compensation is not taxed; thus, after-tax earnings may be a more appropriate measure of lost earnings. This is particularly true for workers in higher income groups.

Several analyses of unemployment duration based on search theory have been done. These could provide some indirect information about how unemployment costs are distributed since earnings losses and unemployment duration are positively correlated. However, as Welch (1977) has pointed out, these analyses are severely limited by both conceptual and methodological problems (many exclude unemployed workers not receiving unemployment compensation), making it difficult to draw reliable conclusions from them.

This paper explores the recent unemployment experiences of household heads, concentrating on how the burden of unemployment is distributed. We begin by discussing the measures of unemployment and its costs that we use in these analyses. We then describe the data source and the samples. This is followed by an investigation of the impact of household heads' unemployment on the well-being of individuals in households over a recent nine-year period; this investigation centers on an estimate of the proportion of individuals in poverty who would have avoided such serious hardships had heads of their households not experienced unemployment.[3] The subsequent two sections of the paper concentrate on the household heads, looking at the incidence and duration of unemployment, the receipt of unemployment compensation, and the economic burden of unemployment over a one-year period, with particular attention focused on identifying the subgroups of the population of household heads who were strongly affected by unemployment in 1976. We then turn to short-run versus long-run comparisons of the burden of unemployment, and we explore the degree to which this burden is concentrated among male household heads in the labor force. The final section summarizes our major findings.

MEASURES OF UNEMPLOYMENT

Although the unemployment rate, or incidence of unemployment, refers to the percentage of the labor force unemployed during a given time period, it can be measured in a variety of ways depending on how one defines "unemployment." This definition has been under contention for some time. Some argue that "discouraged workers"--individuals who have stopped looking for work because work opportunities seemed very bleak—and/or involuntary part-time workers--persons working part-time who would prefer full-time work—should be counted among the unemployed. Currently the standard procedure is to count involuntary part-time workers as part of the employed labor force and discouraged workers as being out of the labor force.

In this study, some of our descriptive figures for the unemployment rate include involuntary part-time workers among the unemployed, but in most of our analyses we do not count involuntary part-time workers among the unemployed. Since information was not available to properly identify discouraged workers, we have not analyzed worker discouragement.

---

[3] Over a nine-year period families change a great deal, and an individual may have moved between several households. For this reason, we chose to examine the long-run effects of unemployment on the well-being of individuals rather than families. This approach parallels that used by Coe (1978) in his analysis of the long-run incidence of poverty using Panel Study data.

Our measures of duration of unemployment are based on reported time spent unemployed.[4] When possible, we decompose the reported time spent unemployed into reported spells of unemployment and average spell duration. We also measure the extent of unemployment as a percentage of committed work time (calculated as the sum of both unemployment time and work time).

Measures of the direct economic losses resulting from unemployment are based on an estimate of lost earnings--calculated as the product of unemployment hours,[5] the hourly wage received when working, and a calculated tax rate--and on an adjustment for reported unemployment compensation. Estimates of change in poverty status as a result of unemployment are based on comparisons of actual total family income relative to needs[6] with what the family income relative to needs would have been if the head had not been unemployed. This second figure equals actual total family income, plus estimated lost earnings of the household head, minus any unemployment compensation received by the household head, divided by family needs. This analysis ignores tax effects since it concentrates on movement with respect to the poverty level, where incomes are so low that both the marginal and average tax rate are close to zero. Later the direct economic losses due to unemployment are calculated using tax rates. Lost disposable earnings are (1 - tax rate) times lost earnings.[7] Lost disposable income equals lost disposable earnings minus unemployment compensation received.

---

[4] Reported time spent unemployed is ascertained from questions such as "Did you miss any work in (past year) because you were unemployed or temporarily laid off?" and "How much work did you miss?" The wording of this question sequence varied somewhat over the years, and "on strike" was substituted for "temporarily laid off" in the 1969-1975 interviews. Thus, some years' measures of unemployment time combine strike time and unemployment time. And information was not available as to whether the respondent was actually looking for work during the reported time spent unemployed. This may not be a serious omission. Many of these analyses look only at prime-age men who headed households for a ten-year period and who reported themselves as working, temporarily laid off or unemployed at the survey interview each year from 1968 to 1977. We suspect that the distinction between time unemployed and time out of the labor force is not particularly important for this group.

[5] Unemployment hours are calculated as the product of reported weeks of unemployment and reported hours worked per week when working.

[6] The needs level for a family is computed from an index based on the poverty guidelines of the Social Security Administration. This index is based on number, age, and sex of family members.

DATA AND SAMPLES

This study uses data from the Panel Study of Income Dynamics, with the years of data and the samples varying according to the purpose of the analysis. We investigate the long-run impact of unemployment of household heads on the poverty status of individuals using information pertaining to the years 1967-1975 for all panel members living throughout that period.[8] Other analyses look only at household heads and are further limited to those household heads who were either working, temporarily laid-off, or unemployed/looking for work[9] at the interview date (we will refer to them as "labor force participants") since unemployment information for other potential workers was unavailable.[10] The analyses of 1976 unemployment are for men and women who were household heads and labor force participants in both 1976 and 1977. The comparisons of short-run versus long-run burdens of unemployment are for men aged 35-64 in 1976 who were household heads and labor force participants every year of the ten-year period 1968-1977; we call these men "stable male household heads."

Household heads comprise a large and important segment of the labor force, but they do not represent all subgroups of workers, particularly not young workers and working wives. Bureau of Labor Statistics figures allow us to compare the extent of unemployment of household heads with that of all labor force participants. Throughout the ten-year period from 1967 through 1976, differences in the levels of both incidence and duration of unemployment between household heads and all workers remained fairly constant (Table 1.1). The unemployment rate (as measured over the survey week) for household heads was consistently lower than that for all workers, whereas the annual duration of unemployment was usually somewhat higher. Household heads averaged unemployment rates one-half to two-thirds as high as those of all workers. But among the workers who did experience some unemployment, the average duration of unemployment of household heads ranged from being equal to that of all workers to being 30 percent longer. The differential in unemployment incidence did increase somewhat with the overall level of unemployment whereas the differential in duration decreased somewhat. Overall, however, trends in both indicidence and duration of unemployment for household heads closely paralleled those of all workers.

---

[7] The marginal tax rate is used in analyses of the unemployment experiences of all household heads during 1976; however, for the short- and long-run comparisons of the burden of unemployment, the average tax rate is used since marginal tax rates were only available for two of the ten years.

[8] At the time of this analysis, adequate information was not accessible for individuals other than the head for the year 1976.

[9] "Unemployed/looking for work" is abbreviated "unemployed" in the table headings.

[10] Each year Panel Study respondents are asked, "We would like to know what you do--are you working now, looking for work, retired, a student, a housewife, or what?" Answers are categorized as: (1) working now; (2) only temporarily laid off; (3) looking for work, unemployed; (4) retired; (5) permanently disabled; (6) housewife; (7) student; and (8) other. The "other" category is primarily composed of institutionalized individuals. The "looking for work/unemployed" category may include some heads who would not be counted as unemployed in official unemployment statistics because they are not actively looking for work. A similar issue arises with reported unemployment hours. Respondents are not asked to break down their reported unemployment hours into time spent looking for work and time out of the labor force.

Panel Study unemployment figures are very similar to the officially published statistics for household heads when comparable definitions of unemployment are used. With the Bureau of Labor Statistics' definitions of labor force participation and unemployment, we calculated an unemployment rate of 4.9 percent for household heads as of the date of the interviews in 1976. This Panel Study unemployment rate closely parallels the published BLS unemployment rates for household heads of 5.0 percent and 4.8 percent in March and April 1976, respectively (months that are most comparable to the Panel Study interview dates).[11]

EFFECT OF HOUSEHOLD HEADS' UNEMPLOYMENT ON THE WELFARE STATUS OF INDIVIDUALS

In most households, the household head is the primary, and in many cases the only, wage earner. Consequently, unemployment of the household head can strongly

---

[11] We also found that 23 percent of the Panel Study household heads unemployed at the time of the 1976 interview voluntarily classified themselves as temporarily laid-off. This is quite low compared to what Feldstein (1978) states as generally the percentage of unemployment spells that temporary layoffs account for in CPS data--50 percent. This discrepancy is likely due to the differences between the CPS and Panel Study employment status questions. Unemployed persons in the CPS are explicitly asked about temporary layoffs; in the Panel Study, a household head is coded on layoff if he or she volunteers this information. In part because of these differences, temporary layoffs are not analyzed separately from other forms of unemployment in this chapter.

Table 1.1

INCIDENCE AND DURATION OF UNEMPLOYMENT 1967-1976
(U.S. civilian labor force)

	Unemployment Rate (Percentages)									
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Household Heads										
Male	1.9	1.7	1.6	2.7	3.4	3.0	2.5	2.9	5.4	4.7
Female	3.8	3.5	3.4	4.3	5.4	5.4	5.3	5.5	7.6	7.5
All	2.1	1.9	1.8	2.9	3.7	3.3	2.9	3.3	5.7	5.1
Total Civilian Labor Force										
Males 20 years and over	2.3	2.2	2.1	3.5	4.4	4.0	3.2	3.8	7.2	5.9
Females 20 years and over	4.2	3.8	3.7	4.8	5.7	5.4	4.8	5.5	8.0	7.4
Both sexes 16-19 years	12.9	12.7	12.2	15.3	16.9	16.2	14.5	16.0	19.9	19.0
All	3.8	3.6	3.5	4.9	5.9	5.6	4.9	5.6	8.5	7.7

	Average Weeks of Unemployment for Those Who Experienced Unemployment									
	1967	1968	1969	1970	1971	1972	1974	1973	1975	1976
Household Heads	11.1	11.0	10.0	10.6	13.6	12.1	12.5	9.7	16.4	19.1
Total Civilian Labor Force	8.8	8.5	7.9	8.8	11.4	12.1	10.0	9.7	14.1	15.8

Source: U.S. Bureau of Labor Statistics, Employment and Earnings, and Monthly Labor Review.

TABLE 1.2

PERCENTAGE OF INDIVIDUALS IN HOUSEHOLDS, 1967-1975, WITH UNEMPLOYED HOUSEHOLD HEADS AND THE EFFECTS OF THE HOUSEHOLD HEADS' UNEMPLOYMENT ON THEIR POVERTY STATUS

(For all individuals continuously in the panel, 1968-1976.)

	Number of Observations	Weighted Percentage of Observations	Percentage in Household Headed by Unemployed Worker Some Time During 1967-1975	Mean Weeks 1967-1975 with Household Head Unemployed	Percentage Who Would Not Have Been Poor or Near Poor if Household Heads Had Not Been Unemployed
All Individuals					
Poor or Near-Poor[a]	3,612	10.5	47.3	24.7	9.7
Neither Poor nor Near-Poor[a]	10,594	89.5	42.0	10.7	-
Entire Sample	14,206	100.0	42.6	12.2	1.0
Those in Households 1967-1975 with Household Head Not in Labor Force[b]					
Poor or Near-Poor[a]	650	3.0	0	0	0
Neither Poor nor Near-Poor[a]	476	4.8	0	0	0
Entire Subgroup	1,126	7.8	0	0	0
Those in Households 1967-1975 with Household Head in Labor Force[b]					
Poor or Near-Poor[a]	2,962	7.5	65.8	34.4	13.5
Neither Poor nor Near-Poor[a]	10,118	84.7	44.4	11.3	-
Entire Subgroup	13,080	92.2	46.1	13.2	1.1
Those in Household Headed by Unemployed Worker Some Time 1967-1975					
Poor or Near-Poor	2,017	5.0	100.0	52.3	20.5
Neither Poor nor Near-Poor	4,960	37.6	100.0	25.5	0.0
Entire Subgroup	6,977	42.6	100.0	28.7	2.4

[a] Individuals are classified as "poor or near-poor" if their 1967-1975 family income/1967-1975 family needs was less than 1.25.

[b] A household head is classified as "in the labor force" if his/her reported employment status at the interview date was working, temporarily laid-off, or unemployed.

affect the economic well-being of all household members.

We investigated the extent of exposure to such unemployment and its effect on welfare status for individuals in the Panel Study from its beginning in 1968 through 1976.[12] Over the nine-year period from 1967 through 1975, two-fifths (42.6 percent) of these individuals were at some time members of a household headed by an unemployed worker (Table 1.2). The extent of this unemployment, in many cases, was considerable--averaging 28.7 weeks for those in households where the head was unemployed sometime between 1967 and 1975. For individuals in or near poverty--those whose nine-year average family income relative to needs was less than 1.25--this experience was even more protracted; these individuals averaged one year out of the nine (52.3 weeks) with the household head unemployed.

Unemployment experienced by household heads caused severe hardship for a substantial proportion of family members. One-fifth (20.5 percent) of the individuals who were in or near poverty and who lived at some time with an unemployed household head, would not have been poor or near-poor if their household heads had never been unemployed.[13] One-tenth (9.7 percent) of all poor or near-poor individuals would have attained nine-year income/needs levels greater than 1.25 if the heads of these households had not experienced unemployment.

1976 UNEMPLOYMENT EXPERIENCES OF HOUSEHOLD HEADS

For the analysis described in this section, the sample is restricted to Panel Study individuals who were household heads in both 1976 and 1977[14] and who, at the time of the interview in each year, reported themselves either working, temporarily laid off, or looking for work.[15] The incidence, frequency, and duration of unemployment among these household heads are analyzed along with the resulting income loss, taking into account receipt of unemployment compensation. For each of these topics we begin by investigating mean differences across basic demographic characteristics--race, sex, age, and poverty status. Unemployment experiences are then analyzed in a multivariate context.

---

[12] Panel Study individuals under age 10 by 1976 are excluded from the analysis since they were not alive throughout the nine-year period.

[13] This estimate is based on imputed income in the absence of unemployment of the household head, calculated as actual income + (unemployment hours of household head x working wage of household head) - unemployment compensation received by household head. All income and needs figures were converted to 1976 dollars. This procedure ignores possible compensating steps taken by the family, such as family members other than the head increasing their work hours in response to the household head's unemployment. It also ignores possible effects of receipt of transfers other than unemployment compensation being contingent on low income resulting from unemployment.

[14] Each year in the Panel Study household heads are questioned about their unemployment experiences during the preceding year. Consequently, data on 1976 unemployment experiences of 1976 household heads is only available for individuals who were household heads in both 1976 and 1977.

Household heads in 1976 did not typically become unemployed voluntarily; only 20.3 percent of the household heads unemployed at some time in 1976 reported quitting their previous job. Hence, we expected to find unemployment incidence strongly related to labor demand. We also expected that unemployment duration would be related to labor demand, both for those who quit work and for those who became unemployed involuntarily. While no formal explanatory models of the unemployment process are proposed here, job characteristics, location measures, and the local unemployment rate are among the factors investigated in the multivariate analyses.

Incidence and Duration of Unemployment

During 1976, 15.3 percent of all the household heads in the labor force experienced some unemployment (Table 1.3) and, on average, those who did were out of work for about one-quarter of the year (13.4 weeks, as Table 1.4 indicates). Exposure to unemployment varied substantially according to poverty status. This was true regardless of whether we measured poverty status on the basis of actual 1976 family income ("actual status") or on the basis of an estimate of family income in the absence of unemployment ("potential poverty status").[16] Household heads who were poor or near-poor[17] (henceforth referred to as poor) were more likely to have experienced some unemployment during 1976 than were households at higher levels of economic well-being. Also, among those who experienced some unemployment, the poor household heads spent more time unemployed. When we considered potential 1976 income in the absence of unemployment rather than

---

[15] Information about time spent unemployed is not available for other household heads.

[16] Estimated family income in the absence of unemployment = actual family income + (reported unemployment hours of household head x working wage of household head) - unemployment compensation received by household head.

[17] A family income/family needs value less than 1.25 classifies the individual as "poor or near-poor."

Table 1.3 (page 1 of 2)

PERCENTAGE OF HOUSEHOLD HEADS UNEMPLOYED IN 1976 BY RACE, SEX, AGE AND POVERTY STATUS (For all household heads reporting themselves working, temporarily laid-off or unemployed in both 1976 and 1977.)

Subgroups	Unweighted Number of Observations	Weighted Percentage of Observations	Percentage Reporting Some Unemployment During 1976	Percentage Reporting Some Unemployment or Involuntarily Working Part-time During 1976
White Men				
under age 25	387	9.1	30.8	31.0
25-34	836	23.8	15.7	16.3
35-44	422	15.6	11.1	11.1
45-54	451	17.7	10.1	10.9
55-64	204	8.2	6.5	7.6
65 or older	25	1.2	8.6[a]	8.6[a]
All	2,325	75.5	14.2	14.7
Black Men				
Under age 25	220	1.1	35.1	36.9
25-34	322	2.4	22.8	23.1
35-44	176	1.6	25.1	25.3
45-54	134	1.2	15.4	19.9
54-64	90	0.8	12.0	12.2
65 or older	2	0.1	---[b]	---[b]
All	944	7.1	22.5	23.7
Women				
Under age 25	147	3.0	34.8	37.4
25-34	183	4.6	17.3	17.4
35-44	135	3.0	11.0	17.0
45-54	135	3.2	11.9	13.0
55-64	101	2.8	11.9	12.2
65 or older	22	0.7	17.8[a]	23.8[a]
All	723	17.3	17.4	19.5

Table 1.3 (page 2 of 2)

Subgroups	Unweighted Number of Observations	Weighted Percentage of Observations	Percentage Reporting Some Unemployment During 1976	Percentage Reporting Some Unemployment or Involuntarily Working Part-time During 1976
1976 Poverty Status:				
Actual Status				
Poor or Near Poor	440	5.3	45.2	48.0
Neither Poor nor Near Poor	3,552	94.7	13.6	14.4
Potential Poverty Status:[c]				
Poor or Near-Poor	360	3.9	26.4	30.0
Neither Poor nor Near-Poor	3,632	96.1	14.9	15.6
All	3,992	100.0	15.3	16.2

[a] 20-29 observations
[b] Fewer than 20 observations

[c] Poverty status is based on estimated family income in the absence of unemployment calculated as actual family income + (head's working wage x head's reported unemployment hours) - head's income from unemployment compensation.

actual 1976 income, we found that poor household heads were almost twice as likely to have been unemployed during 1976 as were non-poor household heads (Table 1.3), and that, among the unemployed, the poor averaged about one more week of unemployment per unemployment spell (Table 1.4). These differences were much stronger when based on actual rather than potential poverty status since those household heads who moved into poverty because of unemployment were unemployed for a longer time than those who would have been poor even if they had not been unemployed (an average of 27.5 weeks as opposed to 14.6 weeks).

Unemployment experiences among household heads varied across other demographic characteristics as well. On average, the 1976 unemployment incidence for black men was one and one-half times that of white men, with 22.5 percent of the blacks being unemployed during some part of 1976 compared to 14.2 percent of the whites[18] (Table 1.3). This race differential remains when we include involuntary part-time workers among the unemployed. Yet among those who did experience some unemployment, race differences in the extent of unemployment were rather small (Table 1.4).

Sex differentials were also evident. The unemployment incidence of female household heads was somewhat higher than that of males; 17.4 percent of the women were unemployed sometime in 1976 as opposed to 14.9 percent of the men. Among the unemployed, although mean total weeks of unemployment and the percentage of potential work time lost due to unemployment did not vary much by sex, both number and duration of spells of unemployment did. The women experienced fewer but somewhat longer spells of unemployment, averaging 1.31 spells of unemployment with each spell lasting an average of 12.4 weeks, while the men averaged 1.69 spells of unemployment with a mean spell length of 11.0 weeks.

Within each of the three major race/sex subgroups of household heads, the younger persons were more likely to have experienced some unemployment. Household heads under age 25 were at least twice as likely as those at other ages to have been unemployed at some time during 1976; over one-third of these young household heads were unemployed during that year. Only among blacks was the age differential somewhat muted, and then only because the incidence of unemployment was considerably higher for older black men than for older white men or women. Among the unemployed, age differences with respect to frequency and duration of unemployment were not very consistent across race or sex.

Comparison of these results with those of Barrett and Morgenstern (1974)

---

[18] "Whites" is actually a catch-all category which excludes only blacks.

Table 1.4 (page 1 of 2)

DURATION OF 1976 UNEMPLOYMENT AMONG HOUSEHOLD HEADS, BY RACE, SEX, AGE, AND POVERTY STATUS

(For all household heads reporting some unemployment in 1976 and reporting themselves working, temporarily laid-off or unemployed in both 1976 and 1977.)

Subgroups	Unweighted Number of Observations	Weighted Percentage of Observations	Mean Weeks Unemployed 1976	Hours Unemployed 1976 Committed Work Time 1976[d]	Mean Number of Unemployment Spells, 1976	Mean Spell Length, Per Person 1976 (in weeks)[e]
White Men						
Under age 25	113	18.2	13.2	.261	1.39	11.3
25-34	138	24.4	11.9	.233	2.02	9.6
35-44	50	11.3	18.0	.361	1.66	15.1
45-54	46	11.6	13.5	.265	1.64	10.9
55-64	16	3.5	—[b]	—[b]	—[b]	—[b]
65 or older	2	0.7	—[b]	—[b]	—[b]	—[b]
All	365	69.8	13.4	.265	1.73	11.0
Black Men						
Under age 25	88	2.4	12.7	.243	1.58	11.1
25-34	79	3.6	13.2	.260	1.29	12.2
35-44	47	2.7	12.9	.263	1.30	12.4
45-54	25	1.2	8.9[a]	.182[a]	1.82[a]	6.8[a]
55-64	19	0.6	—[b]	—[b]	—[b]	—[b]
65 or older	0	0.0	—[b]	—[b]	—[b]	—[b]
All	258	10.5	12.6	.249	1.49	11.2
Women						
under age 25	48	6.9	13.8	.280	1.54	11.6
25-34	31	5.2	14.8	.299	1.13	13.6
35-44	16	2.1	—	—[b]	—[b]	—[b]
45-54	22	2.5	19.2[a]	.374[a]	1.21[a]	17.5[a]
55-64	16	2.2	—[b]	—[b]	—[b]	—[b]
65 or older	3	0.9	—[b]	—[b]	—[b]	—[b]
All	136	19.7	13.8	.278	1.31	12.4

Table 1.4 (page 2 of 2)

Subgroups	Unweighted Number of Observations	Weighted Percentage of Observations	Mean Weeks Unemployed 1976	Hours Unemployed 1976 / Committed Work Time 1976[d]	Mean Number of Unemployment Spells, 1976	Mean Spell Length, Per Person 1976 (in weeks)[e]
1976 Poverty Status						
Actual Status:						
Poor or Near-Poor	173	15.6	21.9	.449	1.74	18.0
Neither Poor nor Near-Poor	586	84.4	11.8	.232	1.60	10.1
Potential Poverty Status:[c]						
Poor or Near-Poor	93	6.8	14.6	.325	1.59	12.0
Neither Poor nor Near-Poor	666	93.2	13.3	.262	1.63	11.3
All	759	100.0	13.4	.266	1.62	11.3

[a] 20-29 observations

[b] Fewer than 20 observations

[c] Poverty status is based on estimated family income in the absence of unemployment calculated as actual family income + (head's working wage x head's reported unemployment hours) - head's income from unemployment compensation.

[d] Committed work time is the sum of reported hours worked and reported hours unemployed in 1976.

[e] Mean weeks unemployed (Column 3) is not equal to the product of mean number of employment spells (Column 5) and mean spell length per person (Column 6). This is because we calculate mean spell length per person rather than mean spell length per spell.

indicates that these age/race/sex differentials in unemployment experiences have existed for quite some time. They found similar differences among all labor force participants--household heads as well as other household members--over the period 1964-1971.[19]

In order to isolate factors underlying these basic demographic differentials with respect to unemployment incidence, we performed a Multivariate Classification Analysis (MCA) of the probability of experiencing some unemployment during 1976. This analysis included as independent variables job characteristics, region, and the county unemployment rate along with race, sex, years of work experience, education, and disability. Table 1.5 presents the results of this analysis. In this table the unadjusted mean percentage column indicates the simple bivariate relationship while the figures in the next column have been adjusted to control for other factors included in the analysis.

With controls for industry, occupation, education, and union membership, the percentage unemployed in 1976 was virtually identical for blacks and whites. Additional results indicated that the strong bivariate race differential in unemployment incidence was due to differences both in job characteristics and, particularly, in education.[20] Age differences in the likelihood of experiencing unemployment apparently were not due to the included control factors. Household heads with less than ten years of work experience were shown to have been more likely to be unemployed in 1976 than were workers with more years of work experience, even with controls for several job characteristics. Sex differences in incidence of unemployment were insignificant, both before and after controlling for other factors.

Looking at these controls more closely, we see that in 1976 workers in mining and particularly construction were more susceptible to unemployment, as were blue collar workers, union members, and workers with less than a high school

---

[19] Barrett and Morgenstern, however, derive their measure of average spell duration in a different manner. Instead of calculating the average spell duration separately for each individual and then averaging this across individuals in the age/race/sex subgroup, they divide average weeks of unemployment for the subgroup by the average number of spells of unemployment for that subgroup.

[20] When education was excluded from the analysis, the adjusted mean percentage reporting some unemployment during 1976 was 15.0 for white men and 17.6 for black men. When occupation, industry, and union membership were, instead, excluded from the analysis, the adjusted mean was 15.3 for white men and 15.8 for black men. In both cases, the differences in adjusted means were insignificant at the .01 level.

Table 1.5 (page 1 of 3)

ADJUSTED AND UNADJUSTED MEAN PERCENTAGE REPORTING SOME UNEMPLOYMENT DURING 1976
(For all household heads reporting themselves working,
temporarily laid-off or unemployed in both 1976 and 1977.)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean Percentage Reporting Some Unemployment During 1976	Adjusted Mean Percentage Reporting Some Unemployment During 1976
Race				
White	2,670	89.9	14.7	15.2
Black	1,322	10.1	21.1	15.9
Eta2			0029**	
Eta2 (adjusted)			.0026**	
Beta2				.0000
Sex				
Male	3,269	82.7	14.9	14.9
Female	723	17.3	17.4	17.2
Eta2			.0007	
Eta2 (adjusted)			.0005	
Beta2				.0006
Experience				
Less than 10 years	1,436	27.5	25.9	26.8
10-20	1,034	26.9	12.7	14.1
20-30	728	21.5	12.0	11.8
More than 30 years	794	24.1	9.2	6.6
Eta2			.0337**	
Eta2 (adjusted)			.0330**	
Beta2				.0446**
Education				
0-5 years	164	2.1	33.9	35.1
6-8	387	7.8	20.9	24.1
9-11	757	14.6	22.6	19.5
12	1,467	36.5	15.9	14.3
13-15	587	16.9	14.1	14.2
16	423	14.4	7.6	10.2
17 or more years	207	7.6	4.9	10.3
Eta2			.0267**	
Eta2 (adjusted)			.0253**	
Beta2				.0180**
Disabled				
No	3,697	92.4	14.9	15.0
Yes	295	7.6	20.8	19.6
Eta2			0019**	
Eta2 (adjusted)			.0017**	
Beta2				.0012

Table 1.5 (page 2 of 3)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean Percentage Reporting Some Unemployment during 1976	Adjusted Mean Percentage Reporting Some Unemployment during 1976
Industry				
Agriculture/Mining	201	5.1	14.3	22.1
Durable Manufacturing	656	18.2	16.3	14.8
Non-Durable Manufacturing	344	7.6	18.4	16.3
Construction	342	7.8	36.0	32.6
Transportation/Communications	338	8.0	12.9	11.3
Trade	571	14.6	15.1	15.5
Government	365	8.6	7.2	5.7
Other	1,175	30.1	11.8	13.5
Eta2			.0339**	
Eta2 (adjusted)			.0322**	
Beta2				.0278**
Occupation				
White-collar	1,561	49.1	9.3	13.0
Blue-collar	2,350	48.4	22.2	18.6
Farm	81	2.5	0.9	-3.0
Eta2			0353**	
Eta2 (adjusted)			.0349**	
Beta2				.0125**
Labor Union Membership				
No	3,000	74.2	13.9	14.6
Yes	992	25.8	19.1	17.3
Eta2			.0040**	
Eta2 (adjusted)			.0037**	
Beta2				.0010**

Table 1.5 (page 3 of 3)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean Percentage Reporting Some Unemployment during 1976	Adjusted Mean Percentage Reporting Some Unemployment during 1976
Region				
North East	630	22.6	14.5	16.0
North Central	997	30.1	14.6	15.0
South	1,708	28.6	14.9	13.7
West	657	18.6	18.1	17.4
Eta2			.0014	
Eta2 (adjusted)			.0006	
Beta2				.0013
County Unemployment Rate				
0-9%	2,859	68.6	14.2	14.6
More than 9%	1,133	31.4	17.5	16.9
Eta2			.0017**	
Eta2 (adjusted)			.0015**	
Beta2				.0009

Overall Mean = 15.3
Standard Deviation = 36.0
Sample Size = 3992
R2 (adjusted) = .106

**Significant at the .01 level.

education, particularly those who had not completed grade school.

Income Losses Resulting from Unemployment

Unemployment often resulted in large absolute and relative income losses that placed considerable hardship on many families. Of the poor families with a household head in the labor force in 1976, about one-quarter (26.4 percent) would have attained family income/needs levels at or above 1.25 if the household head had not suffered unemployment.

Looking at the income losses of all household heads unemployed in 1976 (Table 1.6), we find that unemployed household heads lost an average of $2,588 in earnings or $2,137 in disposable earnings during 1976. Unemployment compensation allowed mean recovery of one-quarter (23.7 percent) of the disposable earnings losses of these individuals, but overall losses in disposable income still averaged about one-fifth (19.6 percent) of potential disposable earnings in the absence of unemployment.[21]

As with duration of unemployment, income losses resulting from unemployment varied substantially with poverty status. On average, the poor experienced larger losses in disposable income relative to total potential disposable earnings than did non-poor household heads (Table 1.6). This was, in part, because the poor averaged lower rates of replacement through unemployment compensation. The unemployed poor were less likely than the unemployed non-poor to receive any unemployment compensation at all, and those who did recouped lower percentages of their lost disposable earnings (Table 1.7).[22]

There were also race and sex differences in average economic losses due to unemployment. Among the three major race/sex subgroups of unemployed household heads--white men, black men, and women--the white men averaged the largest absolute losses (Table 1.6). White men who were unemployed averaged $2,960 in lost earnings, $2,409 in lost disposable earnings, and $1,736 in lost disposable income. Their level of lost earnings was 33 percent higher than that of black men and 100 percent higher than that of women. Since race and sex differentials in time spent unemployed were quite small, a substantial part of these differences in lost earnings was due to the higher average wages which white men

---

[21] Potential disposable earnings in the absence of unemployment is labeled "Expected after-tax earnings" in the tables and equals [(estimated lost earnings + reported labor income) x (1 - marginal tax rate)].

[22] This finding is somewhat at variance with Gramlich (1974), but his analysis made no adjustments for tax rates.

Table 1.6 (page 1 of 3)

MEAN INCOME LOSS FROM UNEMPLOYMENT IN 1976 BY RACE, SEX, AGE, AND POVERTY STATUS

(For all household heads reporting some unemployment
in 1976 and reporting themselves working,
temporarily laid-off or unemployed in both 1976 and 1977.)

Subgroups	Mean Estimated Lost Earnings[d]	Mean Lost Disposable Earnings[e]	Mean Unemployment Compensation/ Lost Disposable Earnings	Mean Lost Disposable Income[f]	Lost Disposable Income/ Expected After-Tax Earnings[g]
White Males					
under 25	$2502	$2117	.241	$1511	.189
25-34	$2482	$2065	.241	$1477	.160
35-44	$4574	$3543	.223	$2771	.271
45-54	$3418	$2751	.260	$1839	.169
55-64	___[b]	___[b]	___[b]	___[b]	___[b]
65 or older	___[b]	___[b]	___[b]	___[b]	___[b]
All	$2960	$2409	.243	$1736	.187
Black Males					
under 25	$1894	$1684	.242	$1315	.209
25-34	$2538	$2007	.320	$1236	.156
35-44	$2432	$2030	.240	$1634	.215
45-54	$1734[a]	$1412[a]	.174[a]	$1150[a]	.142[a]
55-64	___[b]	___[b]	___[b]	___[b]	___[b]
65 or older	___[b]	___[b]	___[b]	___[b]	___[b]
All	$2223	$1843	.256	$1348	.186

Table 1.6 (page 2 of 3)

Subgroups	Mean Estimated Lost Earnings[d]	Mean Lost Disposable Earnings	Mean Unemployment Compensation/ Lost Disposable Earnings	Mean Lost Disposable Income[f]	Lost Disposable Income/Expected After-Tax Earnings[g]
Females					
under age 25	$1404	$1302	.203	$ 989	.219
25-34	$1964	$1701	.245	$1332	.223
35-44	---[b]	---[b]	---[b]	---[b]	---[b]
45-54	$1790[a]	$1684[a]	.208[a]	$1305[a]	.322[a]
55-64	---[b]	---[b]	---[b]	---[b]	---[b]
65 or older	---[b]	---[b]	---[b]	---[b]	---[b]
All	$1469	$1330	.205	$1049	.231

Table 1.6 (page 3 of 3)

Subgroups	Meaan Estimated Lost Earnings[d]	Mean Lost Disposable Earnings[e]	Mean Unemployment Compensation/ Lost Disposable Earnings	Mean Lost Disposable Income[f]	Lost Disposable Income/Expected After-Tax Earnings[g]
1976 Poverty Status					
Actual Status:					
Poor or Near-Poor	$2628	$2569	.125	$2274	.414
Neither Poor nor Near-Poor	$2581	$2057	.258	$1428	.155
Potential Poverty Status:[c]					
Poor or Near-Poor	$1200	$1192	.172	$976	.297
Neither Poor nor Near-Poor	$2689	$2205	.241	$1602	.188
All	$2588	$2137	.237	$1560	.196

[a] 20-29 observations.

[b] Fewer than 20 observations.

[c] Poverty status is based on estimated family income in the absence of unemployment, calculated as: actual family income + (head's working wage x head's reported unemployment hours) - head's income from unemployment compensation.

[d] Estimated lost earnings = working wage x reported unemployment hours.

[e] Lost disposable earnings = estimated lost earnings x (1 - marginal tax rate).

[f] Lost disposable income = lost disposable earnings - unemployment compensation received.

[g] Expected after-tax earnings = (reported labor income + estimated lost earnings) x (1 - marginal tax rate).

received when they were working.[23] Sex differentials in the impact of unemployment on income were reduced when income taxes and the receipt of unemployment compensation were taken into account; mean lost disposable income of men was 60 percent higher than that of women, whereas lost earnings were 75 percent higher.

However, race differentials were eliminated and sex differentials were reversed when disposable income losses were measured as a percentage of total potential disposable earnings in the absence of unemployment. Among men, the mean disposable income losses for whites were 18.7 percent of total potential disposable earnings, as compared to 18.6 percent for blacks. For women these relative disposable income losses averaged 23.1 percent--a level 24 percent higher than that of men.

Unemployment Compensation

Overall, almost half (45.5 percent) of the household heads unemployed sometime during 1976 received unemployment compensation, and the receipt of this compensation dramatically reduced the potential income losses due to unemployment. Although household heads who received unemployment compensation averaged disposable earnings losses twice as high as those who did not receive such compensation ($2,937 as opposed to $1,465), their mean levels of lost disposable income were quite comparable (Table 1.7). This was because, on average, unemployment compensation amounted to half of the estimated lost disposable earnings of those receiving the compensation. Those receiving unemployment compensation averaged somewhat lower losses than non-recipients if we measure lost disposable income as a percentage of potential disposable earnings in the absence of unemployment. This difference was particularly strong among unemployed female household heads.

Since receipt of unemployment compensation substantially reduced the direct economic burden of unemployment, we attempted to identify which, if any, demographic characteristics of unemployed workers increased (or decreased) the chances of receiving compensation. To do this, we analyzed receipt of unemployment compensation in a multivariate context, using Multivariate Classification Analysis (MCA). In this analysis the dependent variable was a dummy variable with a value of 1 if some unemployment compensation was received

---

[23] Unemployed white men averaged hourly wages of $5.25 when working, compared to $4.44 for black men and $3.15 for women.

Table 1.7 (page 1 of 2)

MEAN LEVELS OF EARNINGS AND INCOME LOSSES, BY WHETHER UNEMPLOYMENT COMPENSATION WAS RECEIVED
(For all household heads reporting some unemployment in 1976 and reporting themselves working, temporarily laid-off or unemployed in both 1976 and 1977.)

Subgroup	Unweighted Number of Observations	Weighted Percentage of Observations	Mean Lost Disposable Earnings	Mean (Unemployment Compensation/ Lost Disposable Earnings)	Mean Lost Disposable Income	Mean Lost Disposable Income/ Expected After Tax Earnings
White Men						
Received unemployment compensation	170	33.4	$3313	.507	$1909	.173
Did not receive unemployment compensation	195	36.4	$1578	.000	$1577	.200
All	365	69.8	$2409	.243	$1736	.187
Black Men						
Received unemployment compensation	103	4.9	$2320	.550	$1257	.171
Did not receive unemployment compensation	155	5.6	$1428	.000	$1427	.199
All	258	10.5	$1843	.256	$1348	.186
Women						
Received unemployment compensation	45	7.2	$1600	.566	$ 824	.158
Did not receive unemployment compensation	91	12.5	$1176	.000	$1178	.273
All	136	19.7	$1330	.205	$1049	.231
Poor or Near Poor (Actual Status)						
Received unemployment compensation	43	4.7	$3172	.404	$2194	.338
Did not receive unemployment compensation	130	10.9	$2309	.000	$2308	.447
All	173	15.6	$2569	.122	$2274	.414

Table 1.7 (page 2 of 2)

Subgroup	Unweighted Number of Observations	Weighted Percentage of Observations	Mean Lost Disposable Earnings	Mean (Unemployment Compensation/ Lost Disposable Earnings)	Mean Lost Disposable Income	Mean Lost Disposable Income/ Expected After Tax Earnings
Neither Poor nor Near-Poor (Actual Status)						
Received unemployment compensation	275	40.8	$2910	.534	$1608	.151
Did not receive unemployment compensation	311	43.6	$1260	.000	$1260	.159
All	586	84.4	$2057	.258	$1428	.155
Poor or Near Poor[a] (Potential Status)						
Received unemployment compensation	25	2.5	$1342	.474	$ 744	.213
Did not receive unemployment compensation	68	4.3	$1107	.000	$1108	.345
All	93	6.8	$1192	.172	$ 976	.297
Neither Poor nor Near Poor[a] (Potential Status)						
Received unemployment compensation	293	43.0	$3027	.523	$1721	.168
Did not receive unemployment compensation	373	50.2	$1502	.000	$1500	.205
All	666	93.2	$2205	.241	$1602	.188
All						
Received unemployment compensation	318	45.5	$2937	.521	$1668	.170
Did not receive unemployment compensation	441	54.5	$1465	.000	$1470	.218
All	759	100.0	$2136	.237	$1560	.196

[a] Poverty status is based on estimated family income in the absence of unemployment, calculated as: actual family income + (head's working wage x head's reported unemployment hours) - head's income from unemployment compensation.

during 1976. The sample was household heads unemployed sometime during 1976. The independent variables were:

Demographic Characteristics:

Age, Race, Sex, Education, Family Size, Marital Status, Region, City Size, and the County Unemployment Rate.

Factors Affecting Eligibility:

If in Occupation Usually Ineligible for Unemployment Compensation (farmers, private household workers, or self-employed businessmen) If Had Voluntary Job Change During Past Year, Years of Experience,[24] Weeks Unemployed, Number of Spells of Unemployment,[25] Hours Worked Per Week When Working, and Hourly Working Wage.[26]

Job Characteristics:

If Belong to Labor Union, Industry, and If White-Collar Worker.

Job Measures:

Other Family Income (which excludes unemployment compensation of the household head) and Estimated Earnings Loss Resulting from Unemployment.[27]

The MCA was done in four stages, with each additional set of independent variables being added as controls at each subsequent stage.

From the figures in Table 1.8, we see that race, sex, and most other demographic characteristics included in the analysis bore no significant relationship to the likelihood of receipt of unemployment compensation. However, we did find that unemployed household heads in regions other than the northeast, in one-person households, or in counties with relatively lower unemployment rates were less likely to receive compensation. The effect of region remained strong and significant when other controls were added, but the effects of family size and the county unemployment rate became insignificant when controls for eligibility factors were added.

Not surprisingly, several controls for eligibility had significant effects

---

[24] With the control for age, this variable should help measure attachment to the labor force. As such, it was intended to measure the likelihood of not having the minimal length of employment on the previous job to qualify for compensation.

[25] Both weeks and number of spells of unemployment were intended as controls for meeting the minimal waiting period requirement, usually a one-week period.

[26] Both hours worked per week and hourly working wage are intended as controls for meeting some minimal past earnings requirements.

[27] Calculated as: hours of unemployment of household head x working wage of household head.

TABLE 1.8 (page 1 of 7)

MEAN VALUES FOR WHETHER RECEIVED UNEMPLOYMENT COMPENSATION
(For all household heads reporting some unemployment in 1976 and reporting themselves working, temporarily laid off or unemployed in both 1976 and 1977.)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean a	Adjusted Mean b	Adjusted Mean c	Adjusted Mean d
Demographic Characteristics							
Age							
under 25	249	27.6	.391	.415	.423	.428	.414
25-34	248	33.2	.474	.480	.505	.499	.491
35-44	113	16.1	.454	.444	.454	.445	.451
45-54	93	15.3	.524	.476	.404	.406	.409
55-64	51	6.3	.530	.563	.498	.519	.591
65 or older	5	1.5	.193	.082	.287	.294	.341
Eta2			.014				
Eta2 (adjusted)			.007				
Beta2				.015	.008	.008	.010
Race							
White	428	86.0	.457	.451	.453	.455	.455
Black	331	14.0	.440	.478	.467	.454	.451
Eta2			.000				
Eta2 (adjusted)			.000				
Beta2				.000	.001	.000	.000
Sex							
Male	623	80.3	.477	.469	.457	.461	.461
Female	136	19.7	.363	.369	.444	.427	.430
Eta2			.008				
Eta2 (adjusted)			.007				
Beta2				.003	.000	.001	.001
Education							
Less than 9 grades	142	15.3	.475	.442	.457	.441	.438
9 -11 grades	200	21.6	.426	.422	.423	.426	.427
High School	277	37.9	.523	.514	.494	.490	.481
Some College	96	15.6	.331	.376	.418	.436	.451
College +	44	9.6	.416	.442	.428	.435	.442
Eta2			.018				
Eta2 (adjusted)			.013				
Beta2				.010	.004	.003	.002

Table 1.8 (page 2 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percent of Observations	Unadjusted Mean	Adjusted Mean a	Adjusted Mean b	Adjusted Mean c	Adjusted Mean d
Family Size							
1	178	29.3	.305	.324	.369	.361	.316
2	169	24.4	.565	.573	.513	.530	.544
3	137	15.0	.522	.521	.497	.488	.499
4	121	16.1	.500	.490	.509	.499	.517
5 or more	154	15.2	.451	.415	.427	.435	.469
Eta2			.043**				
Eta2 (adjusted)			.037**				
Beta2				.038**	.015	.018	.034**
Marital Status							
Married	477	60.0	.515	.444	.460	.453	.452
Single	134	19.6	.351	.478	.431	.441	.439
Other	148	20.4	.376	.464	.461	.472	.476
Eta2			.023**				
Eta2 (adjusted)			.020**				
Beta2				.001	.001	.000	.001
Region							
Northeast	108	21.4	.617	.599	.598	.605	.621
North Central	175	28.7	.435	.463	.450	.457	.450
South	377	27.9	.361	.388	.381	.368	.358
West	139	22.0	.440	.388	.416	.416	.422
Eta2			.033**				
Eta2 (adjusted)			.029**				
Beta2				.027**	.025**	.029**	.036**
City Size							
500,000 or more	274	32.8	.487	.442	.408	.411	.402
100,000-499,999	157	20.6	.401	.439	.480	.490	.487
50,000-99,999	98	14.2	.446	.453	.480	.495	.498
10,000-49,999	100	17.1	.531	.551	.547	.530	.549
Under 10,000	130	15.3	.380	.397	.394	.380	.379
Eta2			.011				
Eta2 (adjusted)			.006				
Beta2				.009	.012	.012	.015

Table 1.8 (page 3 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean			
				a	b	c	d
County Unemployment Rate							
Under 2%	3	0.8	.325	.207	.127	.117	.205
2-3.9%	42	8.9	.398	.393	.377	.352	.355
4-5.9%	140	18.3	.358	.374	.430	.437	.444
6-8.9%	320	36.1	.423	.423	.418	.426	.423
9-10.0%	92	12.3	.497	.506	.488	.498	.498
10.1-12.0%	92	13.0	.620	.560	.560	.559	.552
Over 12%	70	10.6	.538	.586	.545	.514	.511
Eta^2			.028**				
Eta2			.025**				
Beta^2				.024**	.018	.017	.014
Factors Affecting Eligibility							
If In Occupation Usually Ineligible for Unemployment Compensation							
No	711	93.6	.471	--	.469	.470	.469
Yes	48	6.4	.216	--	.242	.234	.244
Eta2			.016**				
Eta2 (adjusted)			.014**				
Beta2					.013**	.013**	.012**

Table 1.8 (page 4 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percent of Observations	Unadjusted Mean	Adjusted Mean a	Adjusted Mean b	Adjusted Mean c	Adjusted Mean d
If Had Voluntary Job Change							
No	618	79.7	.505	--	.497	.490	.490
Yes	141	20.3	.254	--	.287	.316	.317
Eta^2			.041**				
Eta^2 (adjusted)			.040**				
$Beta^2$					.029**	.020**	.020**
Years Worked Since Age 18							
Less than 5	183	22.4	.419	--	.467	.460	.484
5-9.9	210	24.3	.436	--	.471	.473	.479
10-19.9	158	22.2	.434	--	.402	.416	.412
20-29.9	107	16.9	.434	--	.393	.407	.395
30 or more	101	14.2	.599	--	.563	.532	.504
Eta^2			.014				
Eta^2 (adjusted)			.009				
$Beta^2$					.012	.006	.007

Table 1.8 (page 5 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean a	b	c	d
Weeks Unemployed							
Less than 2	61	7.8	.182	—	.092	.062	.313
2-3.9	104	15.1	.330	—	.322	.329	.528
4-7.9	128	16.6	.325	—	.370	.374	.468
8-14.9	189	23.9	.471	—	.500	.500	.461
15-24.9	143	19.8	.614	—	.621	.626	.508
25 or more	134	16.8	.610	—	.565	.563	.369
Eta2			.081**				
Eta2 (adj.)			.075**				
Beta2					.089**	.096**	.017
Number Spells of Unemployment							
1	545	74.3	.492	—	.493	.495	.498
2	96	12.1	.399	—	.391	.383	.388
3 or more	118	13.6	.300	--	.304	.301	.279
Eta2			.019**				
Eta2 (adj.)			.016**				
Beta2					.019**	.020**	.025**
Hours Worked Per Week When Working							
Less than 35	75	11.0	.322	--	.375	.410	.463
35-39	60	8.7	.346	--	.318	.318	.335
40	387	45.7	.506	—	.494	.480	.477
40-49	114	14.9	.534	—	.520	.527	.524
50 or more	123	19.7	.397	—	.419	.435	.400
Eta2			.023**				
Eta2 (adj.)			.018**				
Beta2					.016	.011	.011

Table 1.8 (page 6 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percent of Observations	Unadjusted Mean	Adjusted Mean			
				a	b	c	d
Hourly Wage							
Less than $2.50	139	16.0	.302	—	.426	.438	.547
$2.50-3.49	192	19.1	.386	—	.389	.397	.445
$3.50-4.49	149	22.7	.418	—	.405	.415	.420
$4.50-5.99	132	18.8	.540	—	.524	.498	.474
$6 or more	147	23.5	.582	—	.520	.518	.418
Eta2			.041**				
Eta2 (adj.)			.036**				
Beta2					.014	.009	.008
Job Characteristics							
If Belong to Labor Union							
No	547	67.7	.398	—	—	.446	.442
Yes	212	32.3	.574	—	—	.474	.481
Eta2			.027**				
Eta^2 (adjusted)			.026**				
Beta2						.000	.001
Industry							
Agriculture/Mining	37	4.8	.550	—	—	.618	.627
Durable Manufacturing	134	19 .5	.501	—	—	.520	.504
Non-durable Manufacturing	77	9.1	.571	—	—	.584	.575
Construction	147	18.3	.496	—	—	.416	.426
Transportation/Communication	51	6.7	.274	—	—	.272	.248
Trade	94	14.4	.239	—	—	.322	.330
Government	34	4.1	.520	—	—	.467	.468
Other	185	23.2	.419	—	—	.480	.480
Eta2			.060**				
Eta2 (adjusted)			.052**				
Beta2						.036**	.035**

Table 1.8 (page 7 of 7)

Independent Variable	Unweighted Number of Observations	Weighted Percent of Observations	Unadjusted Mean	Adjusted Mean			
				a	b	c	d
If White Collar Worker:							
Yes	166	29.8	.374	—	—	.426	.466
No	593	70.2	.489	—	—	.467	.429
Eta2			.011**				
Eta2 (adjusted)			.010**				
Beta2						.001	.001
Income Measures							
Other Family Income							
Less than $1000	326	42.2	.453	—	—	—	.527
$1000-1999.9	61	7.4	.464	—	—	—	.376
$2000-2999.9	58	6.8	.338	—	—	—	.373
$3000-4999.9	105	13.1	.439	—	—	—	.382
$5000-9999.9	154	20.1	.470	—	—	—	.431
$10,000 or more	55	10.4	.524	—	—	—	.408
Eta2			.006				
Eta^2 (adjusted)			.000				
Beta^2							.017
Estimated Earnings Loss							
Less than $500	153	19.2	.234	—	—	—	.188
$500-999	133	16.5	.312	—	—	—	.318
$1000-2499	221	28.4	.439	—	—	—	.474
$2500-4999	161	21.7	.573	—	—	—	.591
$5000 or more	91	14.2	.769	—	—	—	.728
Eta2			.120**				
Eta^2 (adjusted)			.116**				
Beta2							.127**
R2 (adjusted)				.091	.241	.267	.282

Overall Mean = .455
Standard Deviation = .498
Sample Size = 795

**Significant at .01 level.

[a] Adjusted for other demographic characteristics.

[b] Adjusted for other demographic characteristics and factors affecting eligibility.

[c] Adjusted for other demographic characteristics, factors affecting eligibility, and job characteristics.

[d] Adjusted for other demographic characteristics, factors affecting eligibility, job characteristics, and income measures.

on the chances of receiving unemployment compensation. Household heads in occupations generally ineligible for unemployment compensation were naturally much less likely to receive it, as were those with a voluntary job change during the past year and those with less than two weeks of unemployment.[28] Unemployed household heads were also less likely to receive compensation if they experienced more than one spell of unemployment during 1976.

When we examined effects of job characteristics, we found that the percentage of unemployed household heads receiving compensation was smaller if the household head was a union member, but there was no significant effect of union membership on the likelihood of receiving it once industry was controlled for. Unemployed workers in transportation, communication, and other public utilities and trade industries were less likely to be compensated.

As a last step, we added income measures into the analysis. The likelihood of receiving compensation increased consistently and substantially with the level of estimated earnings losses, reinforcing in a multivariate context the tendency demonstrated with simple unadjusted means that recipients of unemployment compensation were those with the larger absolute levels of earnings losses.

Multivariate Analysis of Direct Economic Impact of Unemployment

Thus far we have examined the simple bivariate relationships between basic demographic characteristics and both the duration of unemployment and the income losses resulting from unemployment. We now turn to a multivariate analysis of the direct economic impact of unemployment for those household heads who were unemployed during 1976. In this analysis, we consider the several components of the estimated 1976 disposable income lost as a result of unemployment during that year.

The amount of lost disposable income depends upon the amount of lost disposable earnings and upon the moderating effects of both taxes and unemployment compensation. In fact, lost disposable income is the product of lost disposable earnings and (1 minus (unemployment compensation received/lost disposable earnings)). And lost disposable earnings is itself the product of unemployment hours and the take-home wage. With this is mind, we examined not only the relationship between demographic characteristics and lost disposable income, but also looked at the relationship between the demographic characteristics and the ultimate components of lost disposable income--unemployment hours, take-home wage, and (1 minus (unemployment compensation received/lost disposable income))--as well as the intermediate component--lost disposable earnings. We used regression analysis for this investigation and converted the multiplicative definitional relationships of the components into additive ones by measuring lost disposable income as well as all of its components in natural logarithm form.[29]

---

[28] The number of observations of those with less than two weeks of unemployment was small enough to preclude further subdivision on the basis of less than one week of unemployment.

The "model" for this analysis (Figure 1.1) breaks down lost disposable income into its components and indicates the relationship to be estimated between demographic characteristics and these components. Definitional relationships between the components and the dependent variables are indicated by thick arrows. Demographic variables may affect dependent variables directly (indicated by thinner but solid arrows) or indirectly by operating through work characteristics (indicated by dashed arrows).

We examined the relative strengths of components of lost disposable income by computing the variances of lost disposable income and its components. The ratio of the variance of a component to the variance of its dependent variable indicates the relative strength in terms of accounting for variance in the level of the dependent variable. Of the total variance in ln lost disposable income, 81 percent was attributable to variance in ln lost disposable earnings and 25 percent was attributable to the variance in ln (1 - (unemployment compensation received/lost disposable earnings)), leaving -3 percent[30] attributable to the covariance of these two components. Of the total variance in the earnings component, 84.8 percent was attributable to variance in ln unemployment hours and 16.3 percent was attributable to the variance in ln take-home wage, leaving -0.6 percent attributable to the covariance of these two. Among the ultimate components of lost disposable income--ln unemployment hours, ln take-home wage, and ln (1 - (unemployment compensation received/lost disposable earnings))--ln unemployment hours was the dominant one, with its variance accounting for 68.6 percent (81 percent x 84.6 percent) of the variance in ln lost disposable income, as compared to 25 percent attributable to variance in the natural logarithm of the nonreplacement ratio with respect to unemployment compensation and 13.2

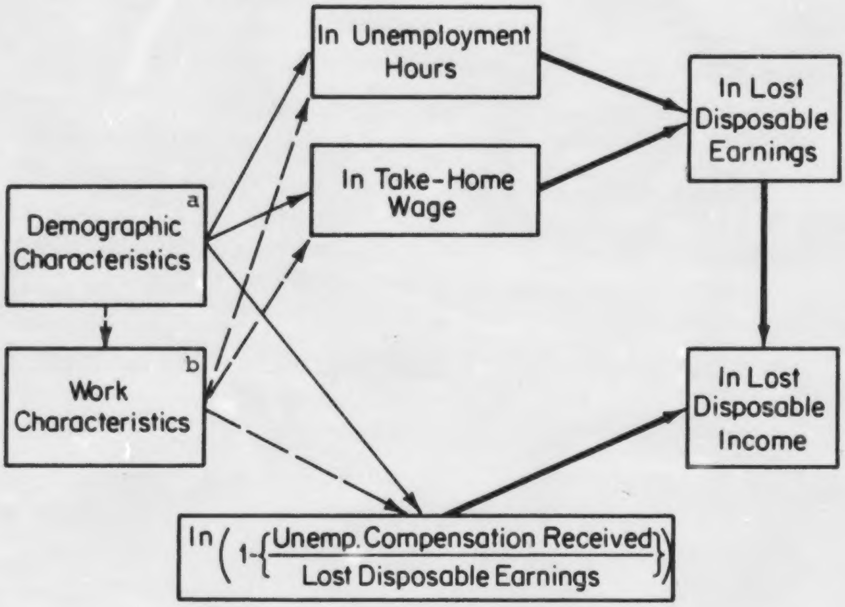
---

[29] For this analysis, the ratio of unemployment compensation received to lost disposable earnings was truncated at .95 since logarithms of negative numbers are undefined.

[30] This is based on the formula: Var (X + Y) = Var (X) + Var (Y) + 2 Cov (X,Y).

FIGURE 1.1
COMPONENTS OF LOST DISPOSABLE INCOME RESULTING FROM UNEMPLOYMENT AND BOTH DIRECT AND INDIRECT PATHS OF EFFECTS OF DEMOGRAPHIC CHARACTERISTICS ON THESE COMPONENTS

(For household heads reporting some unemployment in 1976 and reporting themselves working, temporarily laid-off or looking for work in both 1976 and 1977.)


In Unemployment Hours
In Take-Home Wage
In Lost Disposable Earnings
Demographic Characteristics a
Work Characteristics b
In Lost Disposable Income
In (1-{ Unemp. Compensation Received / Lost Disposable Earnings })

[a] (1) If black; (2) if female; (3) years of education; (4) age, in years; (5) number in family; (6) if single; (7) if widowed, divorced, or separated; (8) if region = Northeast; (9) if city size > 50,000; (10) county unemployment rate.

[b] (1) If industry = durable manufacturing; (2) if industry = construction; (3) if white-collar worker; (4) if in labor union; (5) years of experience.

percent attributable to ln take-home wage.

We next regressed each component of lost disposable income on the demographic characteristics listed in Figure 1.1. This provides information on the extent to which demographic characteristics can be used to predict levels of 1976 disposable income losses experienced by household heads unemployed sometime during that year and also tells us if effects of the demographic variables operating through the components of lost disposable income are complementary or counteracting. Next we explored whether the associations between the characteristics and the amount of disposable income lost as a result of unemployment is altered by adding intervening controls for work characteristics.

From the results of this estimation procedure (Table 1.9), we find that demographic characteristics were not strong predictors of disposable income losses resulting from unemployment, primarily because they did little in predicting the amount of unemployment experienced. (Ehrenberg and Oaxaca, 1976, also found demographic characteristics to be weak predictors of extent of unemployment.) The ten demographic variables included in the analysis collectively explained only 2.7 percent of the variance in ln lost disposable income and even less (0.9 percent) of the variance in ln unemployment hours. And although adding five work characteristics variables at least doubles the adjusted R^2 for both of these dependent variables, these larger regressions still leave 93.6 percent of the variance in ln lost disposable income and 98.2 percent of the variance in ln unemployment hours unaccounted for.

Despite the overall weak explanatory power of these predictors, some did exhibit interesting and important associations with ln lost disposable income and its components. For instance, sex was significantly related to all components of lost disposable income except the degree of nonreplacement through unemployment compensation. Controlling for several other demographic and work characteristics, the direct effect of being female as opposed to male was to lower the level of lost disposable income of an unemployed household head by 52.4 percent. Most of this direct effect was due to the fact that the women in the sample accumulated fewer unemployment hours, but a substantial proportion was also due to the fact that the women had lower take-home wages.

Region demonstrated an interesting effect with respect to unemployment compensation. Unemployed household heads residing in the Northeast as opposed to other regions of the country had proportionately larger percentages of disposable earnings losses replaced through unemloyment compensation. This is consistent with the general tendency of northern industrial states to be more liberal than

Table 1.9 (page 1 of 2)

TOTAL AND DIRECT EFFECTS OF VARIOUS CHARACTERISTICS ON LOST DISPOSABLE INCOME AND ITS COMPONENTS+

(For all household heads reporting some unemployment in 1976 and reporting
themselves working, temporarily laid-off or
unemployed in both 1976 and 1977.)

	Dependent Variable									
	Components of ln Lost Disposable Income									
	ln Lost Disposable Earnings		ln Unemployment Hours		ln Take-Home Wage		ln(1-(Unemployment Compensation Received/Lost Disposable Earnings))		ln Lost Disposable Income	
Independent Variable	Total Effect[a]	Direct Effect[b]	Total Effect[a]	Direct Effect[b]	Total Effect[a]	Direct Effect[b]	Total Effect[a]	Direct Effect[b]	Total Effect[a]	Direct Effect[b]
Demographic Characteristics: If Black	-.124 (.130)	-.011 (.129)	-.046 (.122)	-.037 (.122)	-.077 (.049)	-.074 (.044)	-.113 (.072)	-.104 (.072)	-.237 (.146)	-.215 (.144)
If Female	-.604** .140)	-.462** (.151)	-.285 (.131)	-.338* (.142)	-.319** (.053)	-.123* (.052)	-.030 (.077)	-.062 (.083)	-.633** (.157)	-.524** (.168)
Years of Education	.018 (.017)	.030 (.018)	-.008 (.016)	-.001 (.017)	.026** (.006)	.032** (.006)	.016 (.009)	.019 (.010)	.034 (.019)	.050* (.021)
Age (in years)	-.001 (.004)	-.008 (.010)	-.006 (.004)	-.002 (.010)	.005** (.002)	-.006 (.003)	.005* (.002)	.010 (.006)	.005 (.004)	.002 (.011)
Number if Family	-.017 (.029)	-.017 (.029)	.049 (.028)	.046 (.028)	.031** (.011)	.019 (.010)	.015 (.016)	.015 (.016)	-.002 (.033)	-.011 (.033)
If Single	-.237 (.151)	-.259 (.150)	-.144 (.142)	-.159 (.141)	-.094 (.057)	-.101* (.051)	.167* (.084)	.155 (.083)	-.071 (.169)	-.104 (.166)
If Widowed, Divorced, or Separated	.112 (.149)	.135 (.150)	.149 (.140)	.163 (.141)	-.037 (.057)	-.028 (.051)	.121 (.083)	.128 (.083)	.233 (.168)	.263 (.167)
If Region = NE	.143 (.110)	.097 (.110)	.117 (.103)	.104 (.104)	.025 (.042)	-.006 (.037)	-.204** (.061)	-.288** (.061)	-.062 (.123)	-.131 (.122)
If City Size > 50,000	.148 (.098)	.136 (.098)	.019 (.092)	.042 (.093)	.130** (.037)	.094** (.034)	.007 (.054)	.013 (.054)	.155 (.109)	.149 (.109)
County Unemployment Rate	.034* (.014)	.030* (.014)	.025 (.013)	.027* (.013)	.009 (.005)	.003 (.005)	-.042** (.008)	-.041** (.008)	-.008 (.016)	-.011 (.016)

Table 1.9 (page 2 of 2)

Independent Variable	Dependent Variable: Components of ln Lost Disposable Income: ln Lost Disposable Earnings: Total Effect[a]	ln Lost Disposable Earnings: Direct Effect[b]	ln Unemployment Hours: Total Effect[a]	ln Unemployment Hours: Direct Effect[b]	ln Take-Home Wage: Total Effect[a]	ln Take-Home Wage: Direct Effect[b]	ln(1-(Unemployment Compensation Received/Lost Disposable Earnings)): Total Effect[a]	ln(1-(Unemployment Compensation Received/Lost Disposable Earnings)): Direct Effect[b]	ln Lost Disposable Income: Total Effect[a]	ln Lost Disposable Income: Direct Effect[b]
Work Characteristics:										
If Industry = Durable Manufacturing		-.131 (.118)		-.274* (.111)		.143** (.040)		-.255** (.065)		-.386** (.131)
If Industry = Construction		.380** (.123)		.044 (.116)		.336** (.042)		.104 (.068)		.484** (.137)
If in Labor Union		.184 (.098)		-.141 (.092)		.315** (.033)		-.012 (.054)		-.172 (.109)
If White Collar Worker		-.078 (.112)		-.116 (.106)		.036 (.038)		-.059 (.062)		-.138 (.125)
Years of Experience		.008 (.011)		-.003 (.010)		.011** (.004)		-.005 (.006)		.003 (.012)
R^2	.047	.066	.009	.018	.163	.332	.057	.083	.027	.064
Sample Size	759	759	759	759	759	759	759	759	759	759

[a] Derived by regressing dependent variable on demographic characteristics listed in this table.

[b] Derived by regressing dependent variable on both demographic characteristics in this table.

*Significant at .05 level.

**Significant at .01 level.

+Figures in parentheses are standard deviations.

other states in providing both broader coverage and more generous benefits. Region, however, had little effect on the level of lost disposable income because it had no significant negative effects on the other components.

Even more interesting is the effect of the county unemployment rate. Although it was not significantly associated with ln lost disposable income, it did show associations with unemployment hours and unemployment of compensation. Both unemployment hours and lost disposable earnings of unemployed household heads increased about 3 percent for every increase of one percentage point in their county unemployment rate. This effect, however, was offset by a comparable increase in the degree to which unemployment compensation allowed the recovery of losses in disposable earnings. This is consistent with our earlier finding that household heads in counties with high unemployment rates are more likely than those in counties with low rates to receive unemployment compensation. Areas with high unemployment may have learned by experience how to administer the program efficiently. The larger replacement percentage of individuals in high unemployment areas may also reflect federal legislation extending duration of benefits in areas experiencing extensive unemployment.[31] In any case, the effects of hours and compensation cancel one another out, and there is no significant relation between the county unemployment rate and level of lost disposable income.

Industry measures included in the analysis also exhibited some interesting relationships. Unemployed workers in durable manufacturing suffered lower disposable income losses from unemployment than did those in other industries, both because they spent less time unemployed and because they recovered proportionately more of their disposable earnings losses through unemployment compensation. Unemployed workers in construction, on the other hand, suffered considerably larger losses in disposable income than did those in other industries, both because they spent more time unemployed and because their foregone hourly earnings were higher.

---

[31] By federal legislation, an extended benefits period becomes effective in a state--a state "on" indicator is reached--"in the last week of the 13-week period when the rate of insured unemployment (not seasonally adjusted) in the State for such period (a) equals or exceeds 120 percent of the average of such rates for the corresponding period in each of the preceding 2 calendar years, and (b) is not less than 4 percent." Comparison of State Unemployment Insurance Laws, pp. 3-14 (Revised, January 1975).

UNEMPLOYMENT EXPERIENCES OF STABLE MALE HOUSEHOLD HEADS

Typically, unemployment is measured at a point in time, over a survey period, or during one year, and it usually affects only a small proportion of workers--though those who are unemployed may lose substantial proportions of their potential income while not working. Such short-run "snapshots" of unemployment may be consistent with several different long-run scenarios. Observed unemployment could result from a long-run process in which a large proportion of workers spend some time unemployed but with each losing only a relatively small fraction of his or her potential total work time. Or, it could result from a process in which the same small proportion of workers are unemployed over and over again, with their unemployment time forming a large fraction of both their short- and their long-run potential work time. Whether the first or the second type of long-run unemployment occurs obviously affects the distribution and severity of the unemployment burden and also affects the kinds of policies needed to deal with unemployment.

In this section, we try to clarify these issues by focusing on short- and long-run comparisons of the unemployment burden among the same individuals. We begin by examining average differences in the short- and long-run unemployment experiences of a group of prime-age male workers. We then look at the distribution of the unemployment burden across these workers and try to identify specific groups that are particularly likely to be exposed to chronic unemployment over a ten-year period.

This analysis examines Panel Study men aged 35-64 in 1976 who were household heads and labor force participants every year of the ten-year period from 1968 through 1977. We call these men "stable male household heads," and they should be fairly representative of prime-age male household heads who were stably attached to the labor force over this period.

The sample was restricted to stable household heads because ten-year unemployment information was unavailable for other individuals. It was further restricted to prime-age males because females and young males who were household heads over such a long period are likely to be quite unrepresentative of those who were household heads at the end of the period, and because many older males retired before the end of the long-run observation period.[32]

---

[32] For men who were less than 25 years old in 1967, the probability of heading a household will be partly a function of employment status. And men over 54 in 1967 may respond to unemployment by retiring early. Thus, omitting these men from analysis also avoids some circularity.

In general, our comparisons will apply to the ten-year period 1967-1976 and to the one-year period 1976, a year within this ten-year period when the incidence of unemployment was very high. Some figures are also included for the interview date and for the five-year period 1972-1976.

Short- and Long-Run Differences in the Unemployment Experiences of Stable Male Household Heads

Unemployment becomes more widespread as the time frame lengthens. Although only 3.8 percent of the sample reported being unemployed at the time of the 1976 interview, the figure increased to 10.3 percent for the entire year of 1976, to 28.1 percent for the 1972-1976 period, and to 38.4 percent for the ten-year period from 1967 through 1976 (Table 1.10). Most of this unemployment occurred during the relatively higher unemployment period of 1972-1976. However, whether the observation period was one year, five years, or even ten years, blacks and the poor (those for whom the ratio of ten-year family income to ten-year family needs was less than 1.25) were more likely than average to have experienced unemployment.[33] Between 1967 and 1976, over half (53.6 percent) of the blacks experienced some unemployment, as opposed to about one-third (37.2 percent) of the whites. And about two-thirds (68.2 percent) of the poor were unemployed, as opposed to about one-third (37.5 percent) of the non-poor.

Because more people were exposed to unemployment in the long run, average relative costs of unemployment--both in terms of time and income--were considerably lower in the long run than in the short run. (Absolute costs, however, were higher.) Among those who were unemployed at some time during the observation period, work time losses averaged 16.9 percent of committed work time during 1976 but only 5.3 percent of committed work time during the ten-year period 1967-1976 (Table 1.11). Their average disposable income losses amounted to 21.2 percent of their potential disposable earnings during 1976 but only 4.2 percent of their potential disposable earnings over the ten-year period[34] (Table

---

[33] This section does not present poverty status breakdowns on the basis of "potential poverty status" as in the preceding section. This is because when we adjusted ten-year family income to include our estimate of disposable income lost as a result of unemployment, only 3 of the 110 household heads in or near poverty attained average family income/needs ratios of 1.25 or greater.

Note, that the same percentage of blacks as whites reported being unemployed at the time of the 1976 interview, indicating that unemployment figures based on such a short time span can be quite misleading.

[34] All earnings and income figures have been converted to 1976 dollars.

Table 1.10

INCIDENCE OF UNEMPLOYMENT AMONG STABLE MALE HOUSEHOLD HEADS ACROSS TIME, BY RACE, AGE, AND POVERTY STATUS

(For men aged 35-64 in 1976, who were household heads and reported themselves working, temporarily laid-off, or unemployed 1968-1977.)

Subgroup	Number of Observations	Weighted Percentage of Observations	Percentage Officially Unemployed at 1976 Survey Date	Percentage Reporting Being Unemployed at 1976 Survey Date	Percentage Reporting Being Unemployed Sometime During 1976	Percentage Reporting Being Unemployed or Involuntary Part-Time During 1976[a]	Percentage Reporting Being Unemployed Sometime 1971-1976	Percentage Reporting Being Unemployed Sometime 1967-1976	Percentage Reporting Being Unemployed or Involuntary Part-Time 1967-1976[a]
Whites									
aged 35-44	335	32.9	4.4	5.1	11.4	11.4	30.5	41.5	43.1
aged 45-54	413	40.5	3.5	4.0	9.7	10.6	25.3	34.5	36.1
aged 55-64	189	19.3	0.9	1.3	6.7	8.0	25.3	35.6	36.2
All	937	92.7	3.3	3.8	9.7	10.3	27.1	37.2	38.6
Blacks									
aged 35-44	128	2.9	8.4	8.4	26.4	26.8	53.7	66.9	67.8
aged 45-54	113	2.8	1.4	1.4	14.9	19.5	33.7	44.7	45.4
aged 55-64	73	1.7	0.0	0.0	7.9	8.2	34.8	45.5	45.8
All	314	7.3	3.8	3.8	17.8	19.8	41.8	53.6	54.2
Poor or Near Poor, 1967-76	110	2.9	2.7	6.5	35.6	40.2	52.3	68.2	78.3
Neither Poor nor Near-Poor 1967-76	1141	97.1	3.3	3.8	9.5	10.1	27.4	37.5	38.6
All	1251	100.0	3.3	3.8	10.3	11.0	28.1	38.4	39.7

---

[a] An individual is classified as an involuntary part-time worker if he/she worked less than 35 hours per week on his/her main job and reported wanting more work but was unable to get it on that job.

Table 1.11

EXTENT OF UNEMPLOYMENT EXPERIENCED BY STABLE MALE HOUSEHOLD HEADS IN BOTH THE SHORT AND LONG RUN, BY RACE AND POVERTY STATUS

(For men aged 35-64 in 1976, unemployed sometime during the observation period who were household heads and reported themselves working, temporarily laid-off, or unemployed 1968-1977.)

	Unemployed During 1976				Unemployed During 1967-1976			
Subgroup	Number of Observations	Weighted Percentage of Observations	Mean Weeks Unemployed	Hours Unemployed/ Committed Word Time	Number of Observations	Weighted Percentage of Observations	Mean Weeks Unemployed	Hours Unemployed/ Committed Work Time[a]
White Men	95	87.3	15.5	.292	361	89.8	27.2	.053
Black Men	65	12.7	10.2	.203	187	10.2	28.9	.056
Poor or Near-Poor, 1967-76	35	10.1	11.0	.213	76	5.1	45.6	.096
Neither Poor nor Near-Poor 1967-76	125	89.9	15.3	.288	472	94.9	26.3	.051
All	160	100.0	14.8	.281	548	100.0	27.3	.053

[a] Committed work time = reported unemployment hours during observation period + reported work hours during observation period.

1.12). In the short run, the relative time and money costs of unemployment were higher for unemployed whites than for unemployed blacks, but race differences in relative costs were minor over the long run. This was not the case for poverty status differences, which were much more pronounced over the long run--with the poor having to bear about twice the relative time and money costs of unemployment that were borne by the non-poor.[35]

Distribution of the Unemployment Burden

The ten-year costs of unemployment averaged 5.3 percent of committed work time and 4.2 percent of potential disposable earnings for those who experienced unemployment. These averages, however, mask an important finding. Although average long-run costs (measured as a percentage of expected work time or of expected disposable earnings) are low compared to average short-run costs, there is a small sub-group within the group of stable male household heads for whom both long- and short-run costs are large. Indeed, it appears that a small percentage shoulder the bulk of the unemployment burden among this group of workers.

Figures 1.2 and 1.3 present Lorenz curves[36] depicting the cumulative percentage of total unemployment hours by the cumulative percentage of workers, for the years 1976 and 1967-1976, respectively.[37] If we compare these figures, we see that the unemployment burden was *somewhat* more equally shared in the long run than in the short run (because of more widespread risk of unemployment over the long run), but that even in the long run the bulk of the burden fell on a

---

[35] In 1976, the unemployed poor in the sample accumulated fewer weeks of unemployment than the non-poor (11 vs. 15) and were subject to more frequent bouts of unemployment (2.5 vs. 1.7). But over a ten-year period, the unemployed poor accumulated an average of 45 weeks of unemployment compared to only 26 weeks for the non-poor. Given the small number of unemployed poor (35 in 1976 and 76 in 1967-1970), these results are only suggestive, but they indicate that there is a group of poor prime-age male workers who rotate in and out of low-paying, unstable jobs, frequently alternating relatively short employment and unemployment spells.

[36] For a mathematical definition of the measure, see Morris G. Kendall, *Advanced Theory of Statistics*, Vol. 1 (New York: 1943), pp. 42-44. For general explanations and computation procedures for the measure, see James N. Morgan, "The Anatomy of Income Distribution," *Review of Economic and Statistics* (August 1962), Appendix; and James N. Morgan, et al. *Income and Welfare in the United States* (New York: 1962), pp. 309-321.

[37] Figure A1.1 in the Appendix depicts the distribution of weeks of unemployment 1967-1976.

Table 1.12

INCOME LOSSES FOR UNEMPLOYED STABLE MALE HOUSEHOLD HEADS IN BOTH THE SHORT AND LONG RUN, BY RACE AND POVERTY STATUS

(For men aged 35-64 in 1976, who were unemployed sometime during the observation period, who were household heads and reported themselves working, temporarily laid-off, or unemployed 1968-1977.)

	During 1976				During 1967-1976			
Race/Poverty Status Groups	Mean Estimated Lost Earnings	Mean Unemployment Compensation/ Lost Disposable Earnings[a]	Mean Lost Disposable Income[a]	Mean Lost Disposable Income/Expected After-Tax Labor Income[b]	Mean Estimated Lost Earnings	Mean Unemployment Compensation/ Lost Disposable Earnings[a]	Mean Lost Disposable Income[a]	Mean Lost Disposable Income Expected After-Tax Labor Earnings[b]
White Men	$3856	.237	$2601	.220	$7577	.245	$5241	.041
Black Men	$1852	.200	$1375	.163	$5448	.175	$3987	.045
Poor nor Near-Poor, 1967-76	$1411	.182	$1186	.206	$5556	.161	$4780	.085
Neither Poor nor Near-Poor, 1967-766	$3846	.238	$2586	.213	$7458	.242	$5131	.039
All	$3601	.232	$2445	.212	$7360	.238	$5113	.042

[a] Average tax rate used.

[b] Expected after-tax earnings = (labor income during observation period + estimated lost earnings during observation period) X (1-Average tax rate during observation period)

FIGURE 1.2

LORENZ CURVE FOR 1976 UNEMPLOYMENT HOURS

(For men aged 35-64 in 1976 who were household heads and who reported themselves working, temporarily laid-off or looking for work 1968-1977.)

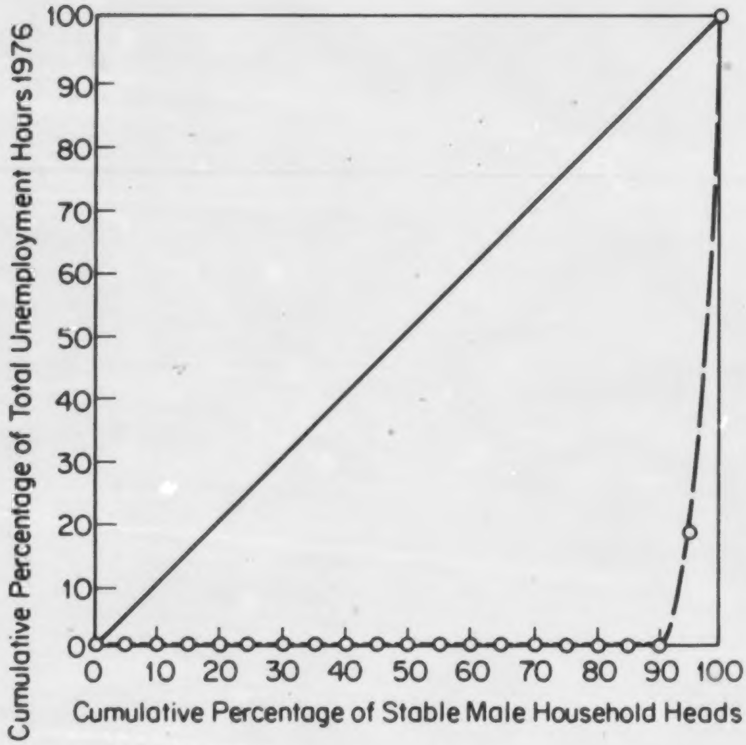
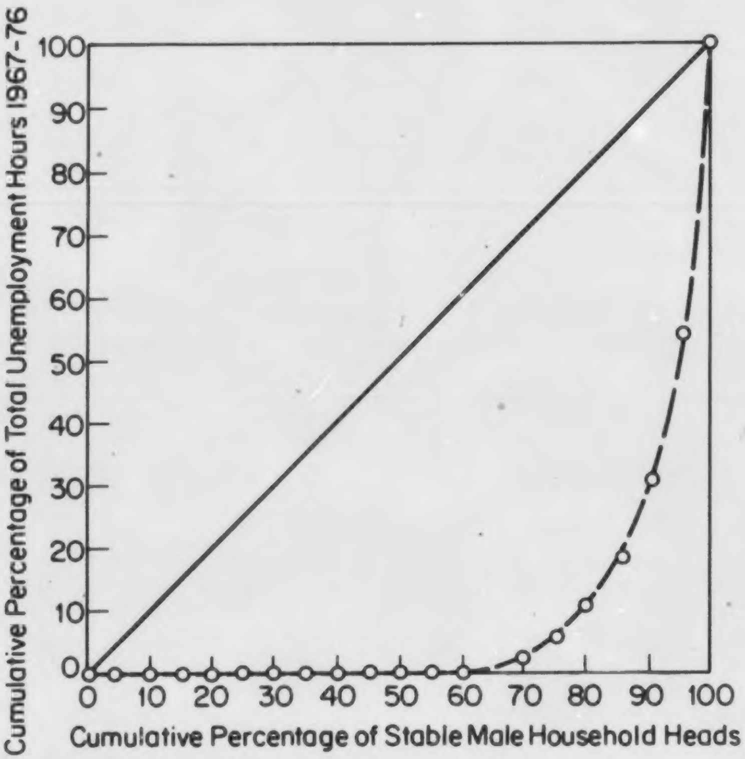


FIGURE 1.3

LORENZ CURVE FOR 1967-1976 UNEMPLOYMENT HOURS

(For men aged 35-64 in 1976 who were household heads
and who reported themselves working, temporarily
laid-off or looking for work 1968-1977.)



small proportion of workers.[38]

In fact, 5 percent of the sample accounted for almost half of the unemployment hours experienced by all the stable male household heads from 1967 through 1976. Each man in this 5 percent missed 64 or more weeks of work, an average of 96 weeks, and lost more than 10 percent of his committed work time, an average of 19.1 percent of committed work time, during this ten-year period. For them unemployment resulted in average losses of $19,114 in after-tax income, or 15.4 percent of their expected ten-year after-tax earnings. So while for most workers there was only a small long-run effect of unemployment, there was a subgroup for whom unemployment was chronic and brought quite severe long-run economic costs. This subgroup also shouldered a large short-run unemployment burden. Three-quarters (77.3 percent) of this small group were unemployed during part of 1976, and those who were accounted for 56.0 percent of the 1976 unemployment hours of the prime-age male household heads. Interestingly, those bearing the bulk of the long-run unemployment burden constituted a larger fraction of the short-run unemployed than of the long-run unemployed: the three-quarters of them who were unemployed in 1976 comprised 38.8 percent of the 1976 unemployed, whereas the entire group comprised only 13.0 percent of the 1967-1976 unemployed.

Although this analysis shows a very strong concentration of the unemployment burden among these male household heads, it may well understate the concentration at the family level. Analysis of Panel Study data for all household heads and wives as of 1975 showed evidence of extensive unemployment cumulating within families. In 1975, wives in households where the husband was unemployed for 14 or more weeks were themselves more likely to be unemployed at least 14 weeks.[39]

---

[38] Strong concentration of the unemployment burden was evidenced across other measures as well. For both the short and long run, we measured the burden both in terms of amount of unemployment hours and in terms of unemployment hours as a percentage of total committed work time. For the short run we also examined the distributions of disposable income losses resulting from unemployment and of such losses as a percentage of expected after-tax earnings in the absence of unemployment. (Recode limitations precluded ready access to calculations of the equality of the distribution of ten-year income losses.) From these analyses we found Gini coefficients of .930 for unemployment hours in 1976 compared to .829 for unemployment hours 1967-1976; .931 for unemployment hours/committed work time in 1976 compared to .831 for unemployment hours/committed work time 1967-1976; .967 for estimated disposable income losses resulting from unemployment in 1976; and .947 for estimates of disposable income loss/expected after-tax earnings in the absence of unemployment in 1976. Since a Gini coefficient of 0.0 indicates complete equality, whereas one of 1.0 indicates complete inequality; these results in combination with the unemployment incidence figures show that although a substantial proportion of stable male household heads were exposed to unemployment sometime during the ten-year period, the long-run burden of unemployment as well as the short-run burden was far from being equally distributed among them.

Multivariate Analysis of Various Degrees of Exposure to Unemployment

We next performed a series of Multiple Classification Analyses (MCAs).[40] These MCAs were designed to serve two purposes. First we wanted to isolate characteristics of subgroups of prime-age male workers most strongly affected by unemployment in the long run. Second, we wanted to see if the type of people experiencing the bulk of unemployment in the long run were the same as those experiencing the bulk of unemployment in the short run.

To do this we ran five separate MCAs, each with a different dependent variable but with the same set of independent variables. The dependent variables were all dummy variables:

If unemployed sometime during 1976.
If unemployed sometime during 1967-1976.
If unemployed at least 5 weeks in 1976.
If unemployed at least 5 weeks in 1976 and in two other years 1967-1976.[41]
If unemployed at least 50 weeks during 1967-1976.[42]

---

[39] In 1975, 2.6 percent of all households contained a wife with 14 or more weeks of unemployment, and 6.3 percent contained a family head with 14 or more weeks of unemployment. If the head's and wife's likelihood of exposure to extensive unemployment were statistically independent, we would expect to find 0.164 percent (.026 x .063 = .00164) of all households with both the head and wife unemployed at least 14 weeks. However, the actual figure was 0.4 percent, a value which was statistically different from 0.164 at the 99 percent confidence level. This cumulative unemployment may, of course, result from the wife entering the labor force as a result of her husband's being unemployed for a protracted period.

[40] We also analyzed the determinants of lost disposable income for both 1976 and 1967-1976 for stable male household heads using the same approach as with all 1976 heads (see the section entitled "Multivariate Analysis of Direct Economic Impact of Unemployment"). Results were much the same as those for all 1976 heads. The amount of lost disposable income of the unemployed was determined primarily by their unemployment hours, both in 1976 and in 1967-1976. The duration of unemployment was largely unrelated to demographic characteristics, both in the short-run or in the long-run.

[41] We also did another MCA with the dependent variable "if unemployed at least 5 weeks in each of any 3 years 1967-1976." The results were quite comparable to those for the dependent variable specifying that 1976 be one of the three years.

[42] We also did other MCAs with dependent variables: "if unemployed at least 64 weeks 1967-1976" and "if unemployed at least 40 weeks 1967-1976." The results were comparable to those for the dependent variable "if unemployed at least 50 weeks during 1967-1976."

The last two of these involve different measures of chronic unemployment. The others were included for short-run/long-run comparisons. The independent variables consisted of 1976 measures (end-year measures for the long-run analyses) of the following demographic and job characteristics:[43]

Race.
Age in 1976.[44]
Education in 1976.
County unemployment rate in 1976.
Region in 1976.
Industry in 1976.
Occupation in 1976.
If belong to a union in 1976.

The results of these MCAs are presented in Table 1.13, with the 0-1 values on the dependent variables expressed as percentages. A striking feature of these results is the strong similarity in the relationships of the independent variables to all the dependent variables. Regardless of the time frame, prime-age male workers were more likely to have been exposed to some unemployment and to have been exposed to chronic unemployment if they: (1) ended the observation period with no more than an eighth grade education level, (2) worked in blue-collar jobs, or (3) were in either construction or mining industries. These differences persisted even with the other controls for demographic and job characteristics. Construction workers may, of course, experience higher rates of chronic unemployment because of earlier, voluntary career decisions where they decided to trade off employment stability for high wages.

We also found that in both the short and long run, prime-age male workers who ended the observation period as union members had more exposure to unemployment, but this was primarily because of their occupation, industry, and education level; once these factors were controlled most effects of union membership became insignificant. However, even with the controls, workers who were union members in 1976 were more likely than non-union workers to experience some unemployment during the ten-year period 1967-1976. (This result may be a

---

[43] It is unclear whether we should use end-year, first-year, or average personal and job characteristics for the long-run analyses. We performed several alternate analyses using "average county unemployment rate 1968-1976," "region in 1968," "industry in 1971," "occupation in 1968," and "if belong to a union in 1967." Results were quite similar with these measures.

[44] We used "age in 1976" rather than "work experience" since work experience in 1976 is at least partly a function of unemployment. We ran some analyses in which either "work experience as of 1976," or "work experience as of 1968," was substituted for "age in 1976." The general pattern of results did not change, though effects of work experience were somewhat stronger than those of age.

Table 1.13 (page 1 of 6)

ADJUSTED AND UNADJUSTED MEAN PERCENTAGES OF STABLE MALE HOUSEHOLD HEADS EXPERIENCING VARIOUS AMOUNTS OF UNEMPLOYMENT IN THE SHORT AND LONG RUN

(For men aged 35-64 in 1976, who were household heads and reported themselves working, temporarily laid-off, or unemployed 1968-1977.)

			Percentage Unemployed									
			Sometime During 1976		Sometime During 1967-76		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in 2 Other Years 1967-76		At Least 50 Weeks During 1967-1976	
Independent Variable	Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean
Race												
Black	314	7.3	17.8	10.7	53.6	37.0	13.0	7.9	5.8	2.1	6.6	1.8
Other	937	92.7	9.7	10.2	37.2	38.5	7.2	7.6	3.9	4.2	6.7	7.1
Eta2			.005		.008**		.003		.001		.000	
Eta2 (adj)			.004		.007**		.002		.000		.000	
Beta2				.000		.001		.000		.001		.003
Age in 1976												
35-44	463	35.7	12.6	13.8	43.6	45.3	9.6	19.5	4.8	5.4	6.5	7.6
45-54	526	43.3	19.9	9.6	35.2	34.8	7.9	7.6	4.1	3.9	6.6	6.2
55-64	262	21.9	6.8	5.4	36.4	34.3	3.8	2.9	2.5	1.8	7.2	6.3
Eta2			.005		.006		.007		.002		.000	
Eta^2 (adj)			.003		.005		.005		.000		.000	
Beta2				.010**		.011**		.011**		.004		.001

Table 1.13 (page 2 of 6)

			Percentage Unemployed									
			Sometime During 1976		Sometime During 1967-1976		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in Two Other Years 1967-1976		At Least 50 Weeks During 1967-1976	
Independent Variable	Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean
Education in 1976												
0-8 grades	327	16.6	23.0	21.4	54.2	44.7	15.1	13.9	10.3	9.4	16.4	15.2
9-11 grades	218	14.6	10.7	6.2	53.7	40.5	9.8	6.3	4.7	2.5	7.5	4.7
12 grades	361	32.5	10.5	10.8	41.4	39.2	8.1	8.5	3.5	3.7	6.3	6.2
Some College	139	13.8	5.7	8.0	29.0	37.1	3.4	5.4	1.6	2.9	1.5	3.3
College +	206	22.6	3.1	5.3	17.0	32.2	2.5	4.0	1.1	2.2	2.7	4.5
Eta^2			.045**		.083**		.026**		.024**		.037**	
Eta^2 (adj)			.042**		.080**		.022**		.021**		.034**	
$Beta^2$				.032**		.007		.015**		.016**		.024**

Table 1.13 (page 3 of 6)

Independent Variable	Number of Observations	Weighted Percentage of Observations	Percentage Unemployed									
			Percentage Unemployed Sometime During 1976		Sometime During 1967-1976		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in Two Other Years 1967-1976		At Least 50 Weeks During 1967-1976	
			Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean
County Unemployment Rate in 1976												
Less Than 4%	139	12.6	5.8	3.7	31.6	29.3	5.3	3.3	1.5	0.0	3.6	2.1
4-5.9%	227	17.9	9.3	10.7	35.4	38.3	5.6	6.1	2.0	2.2	4.3	5.6
6-8.9%	523	38.4	10.6	11.1	37.4	39.0	8.1	8.5	4.0	4.3	6.4	6.7
9% or more	362	31.1	12.0	11.6	44.2	41.5	9.2	9.2	6.2	6.4	9.6	9.1
Eta2			.004		.008		.003		.008		.008	
Eta2(adj)			.002		.005		.001		.005		.006	
$Beta^2$				.007		.006		.005		.011**		.007

Table 1.13 (page 4 of 6)

Independent Variable	Number of observations	Weighted Percentage of Observations	Percentage Unemployed: Sometime During 1976		Sometime During 1967-1976		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in Two Other Years 1967-1976		At Least 50 Weeks During 1967-1976	
			Un-adjusted mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean	Un adjusted Mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean
Region in 1976												
Northeast	243	25.6	10.2	10.0	35.6	35.4	8.1	7.2	4.9	4.1	9.2	9.1
North Central	323	31.0	8.4	9.7	38.1	38.7	6.6	8.3	2.9	4.2	5.2	6.8
South	497	26.9	11.4	10.1	38.4	37.7	8.1	7.2	4.4	4.2	5.6	4.6
West	188	16.1	12.0	12.1	43.7	44.1	8.2	7.8	4.2	3.1	7.2	5.9
Eta^2			.002		.003		.001		.002		.004	
Eta^2 (adj.)			.000		.000		.000		.000		.002	
$Beta^2$				.001		.003		.000		.000		.004
Industry in 1976												
Agriculture/Mining	78	5.5	11.1	20.8	30.1	55.2	9.1	18.0	6.8	14.2	12.7	27.3
Durable Manufacturing	257	22.8	11.1	8.2	49.3	40.7	5.3	2.5	3.2	1.5	5.7	2.9

Table 1.13 (page 5 of 6)

			Percentage Unemployed									
			Sometime During 1976		Sometime During 1967-1976		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in Two Other Years 1967-1976		At Least 50 Weeks During 1967-1976	
Independent Variable	Number of observations	Weighted Percentage of Observations	Un-adjusted mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean	Un adjusted Mean	Adjusted Mean	Un-adjusted Mean	Adjusted Mean
Non-Durable Manufacturing	101	7.9	7.2	3.1	45.2	35.9	4.4	1.4	1.9	0.0	2.9	-0.4
Construction	123	7.8	29.9	26.1	60.9	53.4	26.1	23.1	17.7	15.8	22.2	19.1
Transportation/ Communication	117	8.0	2.2	-1.8	46.9	37.0	0.4	-2.5	0.4	-1.3	3.1	0.9
Trade	160	13.4	4.5	7.0	28.2	36.1	3.6	5.6	0.9	1.9	2.9	4.2
Government	100	7.0	3.2	12.3	25.4	22.6	1.4	0.9	0.0	-0.1	1.5	1.9
Other	315	27.5	11.6	14.6	28.5	35.5	10.6	12.9	4.5	5.5	7.2	8.3
Eta2			.049**		.056**		.057**		.050**		.043**	
Eta2 (Adj.)			.043**		.050**		.052**		.044**		.038**	
Beta2				.058**		.024**		.075**		.063**		.078**

Table 1.13 (page 6 of 6)

			Percentage Unemployed									
			Sometime During 1976		Sometime During 1967-1976		At Least 5 Weeks in 1976		At Least 5 Weeks in 1976 and in Two Other Years 1967-1976		At Least 50 Weeks During 1967-1976	
Independent Variable	Number of Observations	Weighted Percentage of Observations	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean
Occupation in 1976												
White Collar	501	49.7	3.7	6.4	20.1	26.6	2.8	4.5	1.0	2.5	2.1	4.1
Blue Collar	712	47.0	17.9	15.6	60.1	53.9	13.3	12.1	7.5	6.5	12.0	11.3
Farmer	38	3.3	0.0	-9.1	5.6	-3.7	0.0	-9.1	0.0	-8.9	0.0	-20.0
Eta2			.057**		.179**		.041**		.027**		.040**	
Eta2	(Adj)		.056**		.177**		.040**		.026**		.039**	
Beta2				.036**		.102**		.033**		.025**		.059**
If belong to Union in 1976												
Yes	384	31.9	15.2	13.1	60.3	51.2	11.0	9.7	6.3	5.5	9.8	7.9
No	867	68.1	8.0	8.9	28.1	32.4	6.1	6.7	2.9	3.3	5.2	6.1
Eta2			.012**		.094**		.008**		.006**		.007**	
Eta2	(Adj)		.011**		.094**		.007**		.006**		.007**	
Beta2				.004		.032**		.003		.003		.001
Overall Mean	1251	100.0	10.3		38.4		7.6		4.0		6.7	
Std. Dv.	1251	100.0	30.4		48.7		26.6		19.6		25.0	
R2	(Adj)			.127		.232		.111		.087		.110

**Significant at .01 level

data artifact, however, since our measures of unemployment for 1968-1974 include strike time.)

Also interesting was the lack of significant independent effects of race. Although larger percentages of blacks were exposed to some unemployment, race differences in the exposure to chronic unemployment over the long run were small. And regardless of the time frame or the minimum cut-off level of unemployment, once controls for industry, occupation, and education were introduced, race differences became insignificant.

Looking at the mean levels of the various unemployment measures, we again see the strong concentration of even long-run unemployment in a small proportion of the prime-age male workers. Although 38.4 percent of the stable male household heads were unemployed at some time during 1967-1976, only 4 percent experienced at least five weeks of unemployment both in 1976 and in two other years in that period, and only 6.7 percent experienced at least 50 weeks of unemployment over the ten-year period. Again, the poor were more susceptible to chronic unemployment than were the non-poor. Almost one-fifth (19.1 percent) of those whose income/needs averaged less than 1.25 during the 1967-1976 period were unemployed at least five weeks both in 1976 and in two other years during that period. An equally high proportion (23.0 percent) were unemployed at least 50 weeks during the ten-year period. This compares to 3.6 percent and 6.2 percent, respectively, for the non-poor stable male household heads. And, although controls for the demographic and job characteristics listed on Table 1.13 reduced these differences, poor workers were still significantly (at the .01 level) more likely to experience repeated substantial bouts of unemployment than were non-poor workers in similar industries, with similar levels of education, and with the same white-collar/blue-collar distinction.

Also noteworthy is the proportion of variance in the measures of exposure to unemployment left unaccounted for; basic demographic and job characteristics explained only about 10 percent of the variance in our measures of chronic unemployment, leaving about 90 percent of the variance unaccounted for.

In all, these results point out a strong need for further identification of workers repeatedly and severely hit by unemployment. They are the ones who assume the bulk of the burden of unemployment, and much is yet to be learned about them.

SUMMARY

We investigated the unemployment experiences of household heads and their direct economic costs. We want to emphasize that although household heads comprise a large and important segment of the labor force, they do not represent all subgroups of workers--particularly young workers and working wives, who are especially likely to experience unemployment. Consequently, this study is not a complete analysis of unemployment; it focuses only on the unemployment of household heads.

This study concentrates on both the extent of exposure to and the level of income losses directly resulting from unemployment. It includes analysis of one-year (1976) unemployment experiences of all household heads and comparisons of one-year and ten-year (1967-1976) unemployment experiences of male household heads who were in the labor force during all these ten years (stable male household heads). It also presents estimates of the extent to which unemployment of household heads moved people into poverty over the period 1967-1975.

We found that the number of persons living in poverty would have been reduced by about 10 percent if all unemployment of household heads between 1967 and 1975 had been eliminated. Consequently, although unemployment among household heads contributes to the poverty status of many individuals, it is clearly not the major cause of poverty. This is not to say that the poor do not experience substantial unemployment. In fact, among the working household heads, those in or near poverty were considerably more likely to be exposed to unemployment in both the short run and the long run than were those at higher levels of economic well-being. Even among our sample of stable male household heads, almost seven out of ten of those in or near poverty reported some unemployment between 1967 and 1976, compared to four out of ten of those at higher levels of economic well-being. And the unemployed, poor household heads spent twice as many weeks out of work and lost twice as large a fraction of their potential disposable earnings as a result of unemployment as those who were not poor. Additionally, among the stable male heads, those in poverty were more likely to experience repeated bouts of substantial unemployment, even controlling for several other demographic and job characteristics. This suggests that--although policies to reduce unemployment of household heads will not eliminate most poverty--if effective, such policies should be particularly helpful to the working poor.

The analysis for all household heads in 1976 reinforced previous findings concerning age/race/sex differences in exposure to unemployment. During 1976, household heads under age 25 were much more likely to have been unemployed than were older household heads, and patterns of unemployment differed by sex, with female household heads averaging somewhat fewer but longer spells of unemployment than male household heads. Among the male household heads, blacks were more likely than whites to have been unemployed.

The analysis also sheds light on the components of the economic costs of unemployment. Disposable income losses as a result of unemployment were primarily a function of time spent unemployed; more than two-thirds of the variance in 1976 disposable income losses among the unemployed was attributable to variance in unemployment hours. However, variance in the amount of unemployment compensation received accounted for as much as one-quarter of the variance in disposable income losses of the unemployed. About half of the unemployed household heads received some unemployment compensation in 1976 and, on average, those who did replaced about half of their disposable earnings losses with compensation.

While able to identify the components of economic losses due to unemployment, we were not able to identify who bears these costs. We found few significant predictors of either unemployment duration or of unemployment compensation.

Other findings indicated that race differences in exposure to unemployment were due primarily to education and job differences. Although, among household heads, black men were about one and one-half times more likely than white men to become unemployed, over both one-year and ten-year periods, this race difference in the incidence of unemployment disappeared once education, industry, and occupation were controlled. The clue to black-white differences in unemployment probabilities seems to lie in the schooling and job sorting processes.

Aside from this, we found that short-run and long-run pictures of average unemployment among stable male household heads differed markedly. During 1976 only one in ten were unemployed, and those who were lost a substantial fraction of their 1976 expected work time and income. On the other hand, between 1967 and 1976 four out of ten were unemployed at some time, but those who were averaged losses in work time and income amounting to only a small fraction of ten-year expected work time and income.

However, in the long run as in the short run, there was considerable inequality in the distribution of the unemployment burden. Among the stable male household heads, only 5 percent of the individuals accounted for almost half of the total work hours lost because of unemployment between 1967 and 1976. These individuals averaged 96 weeks out of work and $19,000 in lost disposable income because of unemployment between 1967 and 1976.

Our attempts to predict who bore the brunt of the unemployment burden in the long run met with limited success. Both in the long run and in the short run, workers with less than eight years of schooling, in blue-collar jobs, and in construction were more likely to be exposed to some unemployment and to experience chronic unemployment. But more dramatic is the fact that all our measures of demographic and job characteristics accounted for only 10 percent of the variance in chronic unemployment. We are still far from adequately identifying those workers who are repeatedly and severely hit by unemployment.

These results, in many respects, raise more questions than they answer. Over the long run we found two distinct groups of unemployed male household heads. The first included most of those who experienced unemployment; for these workers unemployment was an infrequent occurrence with low relative costs of time and money. The other group was small, experienced extensive and chronic unemployment, and suffered severe losses of time and money, whether measured in the short run or in the long run. Recognizing this second group is obviously important; individuals comprising this group are not being integrated into stable employment with present policies even though each of them has at least a ten-year history of labor force participation. But we do not know very much about who makes up this group or why they accumulate so much unemployment--questions of obvious concern to policy-makers. All we know is that education, occupation, and industry make some, though not much, difference. But whether work attitudes matter and whether early experience produces cumulative impacts for particular types of workers but not for others are questions that we cannot answer at present.

References

Barrett, Nancy S., and Richard D. Morgenstern. "Why Do Blacks and Women Have High Unemployment Rates." Journal of Human Resources 9 (Fall, 1974): 453-464.

Coe, Richard D. "Dependency and Poverty in the Short and Long Run." In Five Thousand American Families--Patterns of Economic Progress, Vol. VI, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, University of Michigan, 1978.

Cohen, Wilbur J.; Haber, William; and Mueller, Eva. "The Impact of Unemployment in the 1958 Recession." United States Senate, Special Committee on Unemployment Problems, Pursuant to Senate Resolutions, 252, U. S. Government

Printing Office, Washington: 1960.

Dickinson, Johnathan. "Labor Supply of Family Members." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. I, by James N. Morgan et al. Ann Arbor: Institute for Social Research, 1972.

Ehrenberg, Ronald G., and Oaxaca, Ronald L. "Unemployment Insurance, Duration of Unemployment and Subsequent Wage Gain." *The American Economic Review* 66 (December, 1976): 754-66.

Feldstein, Martin S. "Unemployment Compensation: Adverse Incentives and Distributional Anomalies." *National Tax Journal* 27 (June, 1974): 231-244.

Feldstein, Martin S. "The Effect of Unemployment Insurance on Temporary Layoff Unemployment." *American Economic Review* 68 (December, 1978): 834-846.

Frank, Robert H., and Freeman, Richard T. "The Distribution of the Unemployment Burden: Do the Last Hired Leave First?" *Review of Economics and Statistics* (August, 1978): 380-391.

Gramlich, E. M. "The Distributional Effects of Higher Unemployment." *Brookings Papers on Economic Activity*, Number 3. Washington, D. C.: Brookings Institution, 1974.

Hall, Robert E. "Why is the Unemployment Rate So High at Full Employment?" *Brookings Papers on Economic Activity*, Number 3. Washington, D. C.: The Brookings Institution, 1970: 369-402.

Palmer, John L., and Barth, Michael C. "The Distributional Effects of Inflation and Higher Unemployment." *Brookings General Series Reprint 339*. Washington, D. C.: The Brookings Institution, 1978.

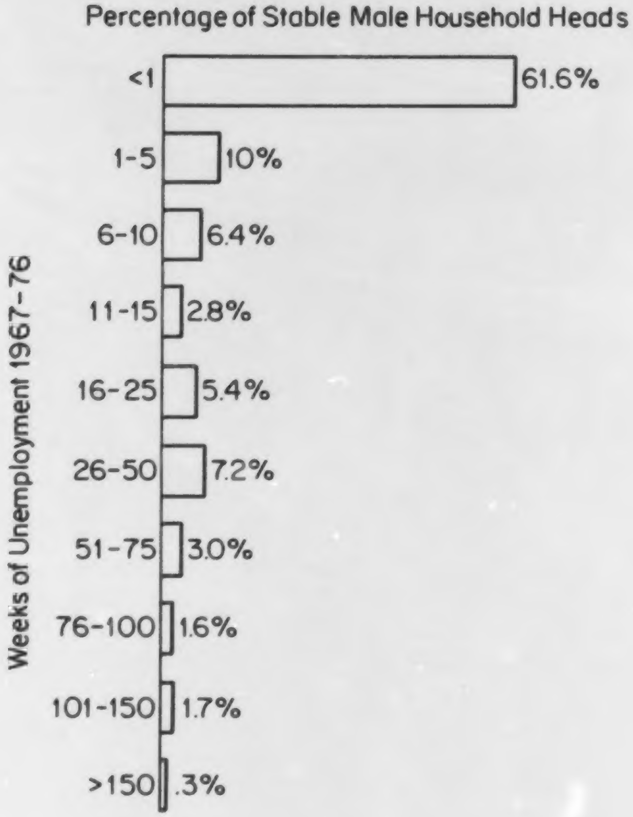
Welch, Finis. "What Have We Learned From Empirical Studies of Unemployment Insurance." *Industrial and Labor Relations Review* 30 (July, 1977): 451-461.

Appendix to Chapter 1

FIGURE A1.1

DISTRIBUTION OF WEEKS OF UNEMPLOYMENT, 1967-1976

(For men aged 35-64 in 1976 who were household heads and reported themselves working, temporarily laid-off, or unemployed 1968-1977.)



Chapter 2

HOURS OF WORK BY FAMILY HEADS: CONSTRAINTS, MARGINAL CHOICES, AND INCOME GOALS

James N. Morgan

INTRODUCTION

In this chapter we use both the cross-section and the dynamic change aspects of the panel data to investigate the work hours of household heads. Separate information on average and marginal wage rates as well as on reported constraints suggested the possibility of assessing the relative importance of constraints, of the need for income, and of the marginal rewards of work in determining hours of work. Economic theory predicts two opposing responses to rising wages. Workers may increase their work hours and decrease leisure since they can earn more during each extra hour of work and since the cost of leisure in foregone earnings is higher--the substitution effect. Or workers may work less since the increased income on their regular work hours allows them to buy back some of their leisure and to achieve a higher income with less work--the income effect. It is possible for the income effect to be negative if leisure is an "inferior good," but that seems unlikely.

We have attempted to separate these offsetting responses in a series of analyses using a number of different measures of intramarginal and marginal wages, for both cross-section and year-to-year change data, and using flexible search strategies as well as multiple regression. The results were consistent across all analyses and all subgroups: As real wages increased, work hours decreased. And when real wages decreased (largely through inflation in the period covered by this study), work hours increased.

This result has two important implications. First, when prices rise faster than wages there will be increased pressure to seek more work. If the advantaged workers with more seniority, credentials, and connections then get the overtime and second jobs or are in a position to find work for other family members, the result may be increased unemployment or underemployment for the least advantaged--including minorities, the young, and women. In this sense, inflation could produce unemployment by increasing the inequality of the access to work.

Second, the results suggest that the supply of labor is largely determined by people's income aspirations. Further study of factors affecting those normative standards is needed. If people continue to demand rising real standards of living, then presumably they will continue to choose more work rather than more leisure.[1] Some work has been done by those concerned with national policy about wages in periods of inflation.[2] And an illuminating comparison of the elasticity of income aspirations in Europe and America shows substantial differences.[3] The authors of the last study also indicate how the principle that aspirations rise with success and decline with failure helps to explain the upsurge in consumer demand for durable goods in the United States and its continuation over the 25 years following the end of World War II.

Our analysis also shows the importance of exogenous constraints on work hours such as unemployment, illness, underemployment (wanting more work), and commuting time.

Background

Studies of labor supply have a long history. Recently, many of them have been based on panel microdata and have typically used the theory of utility maximization and the tradeoff between leisure and money as a starting point. This allows wage rates to have both income and substitution effects on hours.[4] Rosen has even attempted to estimate the net wage rate at different amounts of work hours, since there can be wage penalties for working part-time and, of course, income tax penalties for earning more.[5] D. T. Ulph and others at the University of Stirling have been suggesting alternative specifications to deal both with spurious correlations between wages and earnings per hour and with the fact that overtime, second jobs, and progressive income taxes allow the amount of work to affect the average wage rate.[6]

---

[1] Sebastian de Grazia (1962); Linder (1970) etc.

[2] Hilde Behrend, "Research into Inflation and Conceptions of Earnings," Journal of Occupational Psychology, 50 (1977) pp. 169-176.

[3] George Katona, Burkard Strumpel and Ernest Zahn, Aspirations and Affluence, McGraw Hill, New York, 1971.

[4] See Stanley Masters and Irving Garfinkel, The Labor Supply Response, Academic Press, 1978.

[5] Harvey S. Rosen, "Taxes in a Labor Supply Model with Joint Wage-Hours Determination," Econometrica 44 (May, 1976) 485-507.

Our focus is more on what accounts for changes in work hours, rather than in untangling and estimating any substitution effect. In any case, even the best methods applied by others have revealed only small positive substitution effects. A previous analysis of the panel data by Jonathan Dickinson indicated the importance of constraints on hours of work and the rarity of free marginal choices.[7]

Many male heads of households lost hours of work--generally involuntarily--through unemployment, strikes, or illness, and more than a fifth of them (at least in 1976) wanted more work than they could get. On the other hand, many people reported working more than 2,000 hours a year (which would be 50 standard 40-hour weeks with two weeks of vacation), and 19 percent of working family heads reported an extra job or way of making money in addition to their main job.

Between 1971 and 1976 there was substantial change in hours worked by household heads, though of course some of it may have been reporting error. Table 2.1 shows the relation between total "committed time" in 1971 and in 1976 for some 3,912 persons who remained household heads during that period. "Committed time" includes actual paid work hours, unemployment and strike hours, and hours missed from work because of illness (either their own illness or that of others in the family). Only 39 percent were in the same narrow hours interval in both 1971 and 1976, although 63.8 percent stayed within one neighboring interval of their initial hours.

Perhaps commuting time should also be included in the total commitment that a person makes to earning a living, though some argue that it is a consumption expenditure made to secure a better residential location. Commuting time is likely to affect the amount of time available for paid employment. To avoid spurious relations, we have used a commuting indicator--commuting hours as a fraction of work hours when we turn to accounting for actual paid work hours. We also treat hours of unemployment or illness as constraints reducing paid work hours, rather than part of total committed time.

---

[6] John Ashworth and David Ulph, Estimating Labour Supply with Piecewise Linear Budget Constraints, Discussion Paper, University of Stirling, 1977.

[7] "Labor Supply of Family Members," Chapter 4 of Five Thousand American Families: Patterns of Economic Progress, Vol. I, Institute for Social Research, Ann Arbor, Michigan, 1974, and J. Dickinson, The Estimation of Income-Leisure Preference Structures for Prime Age Married Males, Ph.D. Thesis, University of Michigan, 1976.

Table 2.1

COMPARISON OF TOTAL COMITTED TIME IN 1971 AND 1976
(Percentages for persons who remained heads, 1972-1977)*

1976 Hours	1971 Hours									All
	Less than 500	500-999-	1000-1499-	1500-1899-	1900-2099-	2100-2199-	2200-2399-	2400-2799-	2800+	
Less than 500	15.3	1.3	1.5	1.5	2.4	0.9	1.3	1.1	1.0	26.2
500-999	0.5	0.4	0.3	0.3	0.3	0.1	0.2	0.2	0.2	2.6
1000-1499	0.2	0.7	0.7	0.5	0.5	0.1	0.2	0.2	0.3	3.0
1500-1899	0.2	0.1	1.9	1.9	1.9	0.4	0.4	0.5	0.4	6.1
1900-2099	0.6	0.3	1.1	1.1	7.7	2.2	2.5	2.6	1.4	19.1
2100-2199	0.0	0.1	0.3	0.3	2.2	1.1	1.2	1.2	0.5	6.8
2200-2399	0.2	0.1	0.3	0.3	1.9	1.0	1.7	2.2	1.4	9.2
2400-2799	0.1	0.2	0.4	0.5	1.8	1.0	2.4	4.6	3.3	14.1
2800+	0.3	0.2	0.2	0.3	1.4	1.0	1.5	2.4	5.6	12.9
All	17.5	2.9	4.4	6.9	20.1	7.7	11.3	15.1	14.1	100.0
N	705	110	167	245	875	332	433	570	475	3912

Tau B = .51 (rank correlation)

*Total committed time involves hours of work, illness, and unemployment.

Table 2.1 Collapsed

1976 Hours	Less than 1499	1500-2199	2200+	All
Less than 1499	20.5	6.7	4.7	31.8
1500-2199	4.6	18.8	10.7	32.0
2200+	2.0	8.9	25.1	36.2
All	24.8	31.7	40.5	100.0

Tau B = .51 (rank correlation)

STATISTICAL ANALYSIS OF 1976 PAID WORK HOURS

The theory of individual choice about hours of work involves two opposing responses to wage increases, hence it leads to no specific answers about the effect of wage rate on hours. Higher wages on the hours already worked increase total income and allow or even induce a "purchase" of more leisure. But a higher wage for additional hours of work encourages substitution of leisure for money, since giving up an hour of leisure is now more profitable.

If we could assume that there was some basic similarity among people as to their tastes for money and leisure time--or at least a statistical similarity if age, education, race, income other than the household head's earnings, and the needs of a family are taken into account--and if we could distinguish between intramarginal and marginal wage rates, then it might be possible to separate income and substitution effects.

Our dependent variable is paid work hours, and we use the extra hours committed to the earning of money—hours of unemployment, illness, and commuting--to help explain the paid work hours. Our variables are defined as follows:

Marginal wage rate:

Salaried people were asked: "If you were to work more hours than usual during some week, would you get paid for those extra hours of work? About how much would you make per hour for that overtime?"

Hourly workers were asked: "What is your hourly wage rate for overtime?"

Others (neither salaried nor hourly) were asked, "If you worked an extra hour, how much would you earn for that hour?"

People with extra jobs or other ways of making money in addition to their main jobs were asked, "About how much did you make per hour at this?"

And those who said there was more work available on their jobs, so they could have worked more if they had wanted to, were asked: "How much would you have earned per hour?"

The largest of all these alternatives (or the average hourly earnings if none were larger than that) was taken to be the effective marginal wage--unless the respondent said he or she would have liked to work more if more work had been available, in which case the marginal wage rate was considered to be zero. (Since we shall be using categorical predictors, this group can be considered separately in the analysis.) Before 1977 these marginal wages were only coded to three digits, so those over $10/hour were truncated and the average hourly earnings became our estimate of the marginal wage. Ten percent of the family heads had average hourly earnings greater than $10.

We also estimated an after-tax or "net" marginal wage rate by multiplying the average wage by one minus the marginal federal income tax rate.

Intramarginal wage rate:

Salaried workers were asked: "How much is your salary?" and hourly workers, "What is your hourly wage rate for your regular work time?"

If both these were zero or not ascertained, we took the average hourly earning rate as the intramarginal rate.

Our other predictors included:

Net marginal wage (after tax) minus intramarginal wage.

Annual earnings divided by annual work hours. (This has the potential for spurious negative correlation with work hours if there were any random errors in reported work hours.)

Hours lost due to unemployment or strike.

Hours lost because the family head was ill or because someone else in the family was ill (calculated at 16 hours a day for first eight weeks, then 12 hours a day).

Commuting-time tax--the ratio of total commuting hours to total work hours. (This avoids a spurious correlation between work hours and commuting--if one works only half a year, one's total commuting is also cut in half.)

Other family income.

Family needs level--based on the official poverty definition as of 1967—an indicator of interfamily differences in needs.

Whether there was a childcare problem, i.e., a single working parent, or both parents working, and a child under six years of age in the house.

Whether head supervised others on the job.

Race.

Age, reflecting energy levels.

Head reported wanting more work than he/she could get in 1976.

Wanted less work, even at less pay.

Married.

Marginal tax rate on federal income taxes--a separate indicator of a penalty on extra work.

We summarized the results of several regressions using categorical predictors (Multiple Classification Analysis; see Table 2.2). Some effects are clear. The unemployment, illness, family needs, commuting, and child-care variables all showed strong effects on work hours. But we could not separate income and substitution effects. The intramarginal wage and the difference between the intramarginal wage and the net marginal (after-tax) wage had negative effects on work hours, which became stronger when adjusted for other things--particularly (but unbelievably so) when adjusted for the marginal tax rate.[8] (See Figure 2.1.)

When we omitted the marginal tax rate and hourly earnings and instead used the intramarginal wage and the difference between that and the net marginal wage, both produced almost monotonically negative effects on hours worked, effects which were stronger after adjusting for the other characteristics in the regression. This implies that the income effect dominates; or at least we were unable to see any substitution effect in these static data.

The use of categorical predictors assured us that there were no major nonlinearities and that the effects were indeed mostly monotonic. In order to see the effect of an hour of unemployment or illness on hours of work, we ran two ordinary regression analyses (Table 2.3) and found that one hour of unemployment or illness resulted in one hour less work, the loss apparently not being made up by extra work or overtime at other times during the same year.

Those who said they had wanted more work than they could get had actually worked about 160 fewer hours than average, other things considered; and those few who said they would have preferred less work had actually worked about 167 to 181 hours more than expected. The coefficient on the family need level implies 60 hours more work for every thousand dollars worth of need for income. But when we adjust the needs standard down to the lower official level and adjust it upward for inflation since 1967--producing a net increase of 36 percent--we would estimate that for every $1,000 in needs at current prices, family heads would tend to work an added 44 hours a year.

THE SEARCH FOR SUBSTITUTION EFFECTS

Is there some part of the population, perhaps those unaffected by illness or unemployment, for whom higher wages induce more rather than less work? Using

---

[8] Indeed, there is reason to believe that with substantial samples, introducing highly correlated predictors produces erratic results without providing the usual warnings of exploding sampling errors. This same effect appears if we use ordinary regression.

Table 2.2

REGRESSION ANALYSES OF PAID WORK HOURS IN 1976 USING CATEGORICAL PREDICTORS
(For 3,604 male household heads who worked at least 500 hours in 1976 and earned at least 50 cents an hour.)

	Eta^2	Beta Squared				
Intramarginal wage	.009	.036	.214	.140	-	-
Net overtime premium	.036	.029	.029	-	-	-
Unemployment hours	.125	.106	.062	.065	.048	.110
Ill hours	.034	.034	.024	.030	.016	.035
Commuting time tax	.046	.030	.024	.027	.016	.034
Other family income	.005	.004	.047	.041	.089	.006
Family needs	.028	.004	.019	.014	.032	.038
Child care problem	.010	.000	.000	.000	.003	.0019
Supervises others	.014	.002	.000	.001	.003	.006
Race (Black)	.005	.000	.000	.000	.001	.002
Age	.043	.041	.025	.030	.015	-
Wants more work	.027	.006	.004	.005	.004	.009
Want less work	.004	.004	.002	.003	.002	.004
Married	.012	.008	.012	.014	.014	.000
Marginal tax rate	.078		.222	.216	.574	
Average hourly earnings	.007				.496	.033
R^2 (adjusted)		.289	.375	.357	.473	.263

*Note: Differences in sample included--in Table 2.1 we included families with the same head in 1972-1977 regardless of work status. Here we include 1977 heads who worked in 1976 at a wage rate of at least 50 cents/hour.

FIGURE 2.1
ANNUAL HOURS WORKED BY MALE HOUSEHOLD HEADS IN 1976, BY AVERAGE HOURLY EARNINGS, UNADJUSTED FOR OTHER CHARACTERISTICS, EXCLUDING AND INCLUDING THE MARGINAL TAX RATE

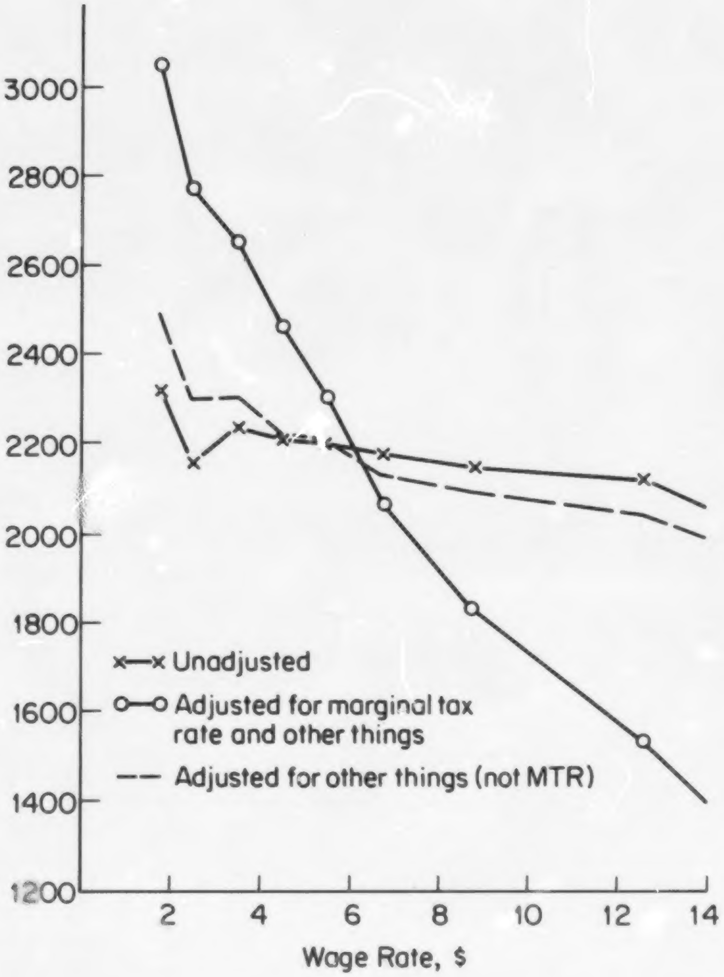


Table 2.3

TWO REGRESSIONS OF WORK HOURS FOR MALE HEADS OF HOUSEHOLD IN 1976
(N = 3,603)

Explanatory Characteristic	Regression Coefficient (b)	T-Ratio	Regression Coefficient (b)	T-Ratio
Hours of unemployment or strike	-1.03	22.8*	-0.98	22.0*
Hours lost by illness (self or others)	-1.04	13.1*	-0.91	11.6*
Wanted more work	-172.	6.4*	-131.	5.0*
Wanted less work	167.	3.7*	181.	4.1*
Family need level	0.059	9.1*	.062	9.3*
Other family income	-.0025	1.8	-.0043	3.1*
Average hourly earnings	-0.17	8.8*		
Intramarginal wage**			-0.42	10.9*
Marginal wage minus intramarginal wage (overtime premium)			-0.65	11.4*
Percent time tax for commuting			-7.48	5.0*
R^2 (adj.)	.205		.233	

*Significant at 5 percent or better. Note that for samples of this size anything with a substantial effect will be significant. However, complex samples violate some of the t-test assumptions.

**For 10 percent of the sample with average hourly earnings of $10 or more, truncation of the marginal wage at $10 makes this identical with the average wage. Also this is a current report while hours and hourly earnings are for the whole previous year.

data for the same 3,604 male household heads who worked at least 500 hours in 1976 and earned at least 50 cents per hour, we used the covariance-search option of the AID III program to search for groups as different as possible in the regression of hours on hourly earnings.[9]

The program divided the sample sequentially, searching at each split for two groups where two separate regressions reduce the error variance most--creating the greatest improvement over a single regression of the parent group. The results were a sequence of splits separating those with substantial unemployment or illness from the rest, but only one group (164 persons) had a positive association between earnings and hours: those household heads who were unemployed 800 hours or more during 1976. Workers with lower wage rates may find it easier to survive on unemployment compensation because it tends to replace a larger percentage of the wage at lower wage levels, or extended unemployment may be simply more common among workers in low-wage jobs. In any case, the positive correlation was only .11 between earnings and hours for those unemployed 800 hours or more, the regression implying an extra 11.5 hours of work for an added dollar per hour.

There is a possibility of a statistical artifact in these negative correlations because we estimated hourly earnings by dividing a report on earnings by a report on hours. Errors in reporting either one of them would create a spurious negative correlation between hours and hourly earnings. For example, overreporting hours would give an individual more than the correct hours and less than the correct amount of hourly earnings. Also, for persons with inferior second jobs rather than overtime pay, any added work would lower the average wage.

Change in Work Hours

Since interpersonal differences are an imperfect proxy for dynamic responses, we also examined how change in hours was related to changes in wages and other conditions. Considering the 3,372 family heads unchanged from 1967 to 1971 who worked at least 500 hours in both 1967 and 1971, and the 2,704 who were heads of families from 1971 to 1977 and who worked at least 500 hours in 1971 and in 1976, we looked at the change in hours between 1967 and 1971 and between 1971 and 1976 as a function of changes in wage rate and changes in the various constraints. Changes in wanting more or less work were handled by using as predictors wanting more or less work in the first or in the last year, four binary predictors rather than all four combinations. We found no evidence of a positive substitution effect.

---

[9] See John A. Sonquist, Elizabeth Lauh Baker, and James N. Morgan, Searching for Structure, revised edition, Institute for Social Research, The University of Michigan, Ann Arbor, Michigan, 1974.

As pay rates increased work hours decreased--and vice versa (Table 2.4). Again, unemployment, illness, or caring for ill family members reduced work hours almost hour for hour.

Increased family needs did have a significant effect of increasing paid work hours of the family, and increases in other income decreased work hours. These effects are net of the constraints taken into account in the regression both by the changed hours of unemployment or illness and by the reports by the head that he or she wanted more or less work in the first or the last year.

Neither wages nor needs were adjusted for inflation, which in reality raised the cost of living by about 20 percent between 1967 and 1971 and by about 41 percent between 1971 and 1976.

Note that those who said they wanted more work currently were working less than others in similar circumstances and those who said they wanted less work were working more. Those who had said in the first year that they wanted more work had increased their hours more, and those who initially reported wanting less work had ended up working less. Analyses of work hours and changes in work hours that are not corrected for these obvious evidences of disequilibrium can clearly be distorted.

We obtained similar results when we used multiple classification analysis (categorical predictors) to predict change in hours worked from the following:

Change in:

unemployment hours
illness hours
marital status
commuting time tax
whether child care problem
wife's work hours
needs
other income
wanting more or less work (9 combinations--see Table 2.5 below)
hourly earnings or intramarginal wage and whether a premium for extra work

Current:

age

The adjusted coefficients for the nine-cell table of wanting more or less work in 1971 or 1976 justified treating them as separable and additive effects,

Table 2.4

TWO REGRESSIONS OF CHANGES IN WORK HOURS FOR UNCHANGED HEADS OF FAMILIES

Explanatory Characteristic	Change in Hours Worked, 1967 to 1971		Change in Hours Worked, 1971 to 1976	
	Regression Coefficient(b)	T-ratio	Regression Coefficient(b)	T-ratio
Change in hourly Earnings	-66.4	16.6*	34.8	10.7*
Change in hours of unemployment	-0.89	17.6*	-0.98	20.0*
Change in hours of illness	-0.79	14.0*	-0.79	10.9*
Change in wife's hours of work	.0006	0.0	-0.0206	1.2*
Change in needs	.042	3.5*	0.0223	2.0*
Change in other income	.0034	1.2	-0.0060	3.1*
Wanted more work in last year	-23.	0.8	-135.	3.9*
Wanted less work in last year	61.	1.4	121.	2.2*
Wanted more work in first year	79.	2.5*	98.	2.9*
Wanted less work in first year	-326.	5.3*	-88.	1.6
R2 (adj.)	.200		.204	

*Significant at 5 percent level or better.

as we did in the ordinary regression, since the interior of Table 2.5 could be estimated rather well from the marginal percentages. One report did not substitute for the other, nor amplify its effect.

Table 2.5

REGRESSION-ADJUSTED CHANGE IN HOURS BY CHANGE IN WANTING MORE OR LESS WORK

In 1976 Wanted:	In 1971 wanted:		
	Less Work	Same	More Work
less work	-13	36	147
same	184	-15	60
more work	-322	-172	-83

The coefficients on change in average hourly earnings indicated that only those whose earnings went up by at least $1 an hour could afford to work fewer hours (Table 2.6).

Table 2.6

CHANGE IN HOURS, 1971-1976, UNADJUSTED AND ADJUSTED BY REGRESSION, BY CHANGE IN HOURLY EARNINGS

Change in Hourly Earnings	Unadjusted	Adjusted	Percent of Sample
Fell 10 cents an hour or more	158	300	8
Changed less than 10 cents	253	257	7
Rose 10-99 cents	127	161	13
Rose $1.00-1.99	-18	-15	18
Rose $2.00-2.99	-71	-108	20
Rose $3.00-3.99	-106	-165	14
Rose $4.00-4.99	-102	-142	7
Rose $5.00 or more	-203	-248	13

Application of the AID III search program to analyze change in hours, using change in hourly earnings as one of the predictors, also produced subgroups with negative relationships between change in wage and change in hours. Most of the groups split off were those with changes in unemployment or in illness hours, or in commuting, and only after that were groups even split on change in hourly earnings. Again, the income effect dominates.

A comparison of the 1971 to 1976 changes with those of an earlier, less inflationary period, 1967 to 1971, induced some interesting speculations (Table 2.4). The apparent difference in the effect of changes in hourly earnings is largely spurious, because the explanatory variable is change in actual hourly earnings, undeflated, and the cumulated rate of inflation over the period 1971 to 1976 was about twice that of the period 1967 to 1971. The implication is that work effort responds (negatively) to changes in real wages, not money wages. The stronger effects of wanting more work in 1976 than wanting more work in 1971 may reflect the more extensive unemployment, or the greater impact of inflation on the need for money. And perhaps a fraction of changes in illness time is a substitute for leisure, not work. In general, however, the pattern of effects is remarkably consistent in the two periods.

Year-to-Year Change and the Current Situation

The picture of constraints, and of a dominant income effect--striving for some standard of living rather than substituting leisure for money in response to relative prices--raises the possibility that aggregate conditions can alter the aggregate amounts of work. Aggregate work hours may respond not just to individual wage changes but also to increases in the cost of living (which reduce real wages), to increases in unemployment or changes in aggregate employment (which alter opportunities), or to increase in real per-capita consumption (which raise everyone's standards or goals). It is even possible that in inflationary periods--when price increases reduce real wages--everyone wants more work; but persons with seniority, training, and good positions take the overtime and the second jobs and get jobs for their own family members, leaving other workers unemployed. In other words, the pressure of inflation may lead to greater inequality in the distribution of available work and to more measured unemployment, even while total work hours are rising.

To investigate this possibility, we looked at year-to-year changes in hours worked as a function not only of individual changes in wage rate, unemployment, illness, family needs, and other income, but also as a function of the environment--inflation, unemployment, rate of change in real aggregate consumption, and rate of change in aggregate employment. Using ten years of data we have nine sets of year-to-year changes. With the 1,519 families with unchanged heads and wives where the head worked at least 500 hours every one of the ten years, that meant 13,671 records of year-to-year change. We created such a file and regressed change in hours against a set of individual and societal variables.

We discovered that year-to-year changes in work hours, whether for family heads only or for heads and wives together, were still dominated by changes in the head's unemployment or illness, by whether the head reported constraints on work time in either the first or second year (he wanted more or less work), and by income-effect responses to changes in the head's hourly earnings (Table 2.7). The increasingly greater and more significant negative effect of increased wage rate on hours of work in the year-to-year change data, compared with either the change data over a longer period or the inference from a single cross-section of static data, raises the question whether there is a more serious problem of spurious correlation with such data. The impact of measurement errors or random shocks, combined with the fact that hourly earnings are estimated by dividing annual earnings by annual work hours, could be more serious in comparison with the small changes that can occur from year to year anyway.

The effects of aggregate changes on individual work hours were in the expected direction, with two exceptions which were not statistically significant.[10] Families, particularly wives, respond to both a rising cost of living and a rising standard of living (measured by increased aggregate consumption) by increasing their work effort. On the other hand, high current levels of aggregate unemployment and increases in aggregate numbers employed may each reduce individual work hours. The last effect may reflect an alternation between more jobs and more overtime for those who already have jobs. Important issues of policy as to the inequality of the access to jobs may be involved here.

If we think of a path model by which changes in aggregate national conditions work either directly on changes in work hours or indirectly by affecting individual changes in unemployment wage rates, illness, etc., the question arises whether our negative findings on the overall adjusted effects of

---

[10] Better statistical procedures first proposed by Arnold Zellner for taking account of the non-independence of the error terms (because each nine of the year-to-year changes are for the same family), would not change the estimated effects but would reduce the sampling errors and probably make some of the other effects "statistically significant." However, application of such procedures when the nature of the clustered sample violates other assumptions seems dubious, and in any case it is the size of the effects that matters. With such substantial samples, things of borderline significance are of doubtful importance.

Table 2.7

YEAR-TO-YEAR CHANGES IN WORK HOURS AS A FUNCTION OF INDIVIDUAL AND AGGREGATE CHANGES

(For 13,671 changes by 1,519 families with same head and wife
where the head worked at least 500 hours each year.)

Explanatory Characteristic	Change in Head's Hours		Change in Hours of Head & Wife	
	Regression Coefficient b	T-Ratio	Regression Coefficient b	T-Ratio
Change in:				
Head's hourly earnings	-94.7	49.09*	-102.8	34.53*
Head's hours unemployed	-.923	43.28*	-.970	29.52*
Head's hours ill	-.498	31.83*	-.532	22.01*
Wife's work hours	-.0004	0.04	--	--
Family needs	.0145	1.42	.0091	0.58
Other income	-.0027	2.04*	--	--
Cost of living	.313	0.78	1.35	2.17*
Real aggregate consumption	.723	1.47	1.92	2.54*
Aggregate employment	-.35	0.08	-0.988	1.53
Level of:				
Current aggregate unemployment rate	-.201	0.52	-.870	1.46
Head wanted more work second year	-90.17	8.66*	-87.20	5.43*
Head wanted less work second year	84.51	8.10*	89.82	5.58*
Head wanted more work first year	-41.10	2.56*	33.08	1.34
Head wanted less work first year	-41.76	2.53*	-32.57	1.28
R^2 (adj.)		.308	.175	

R^2 (adj.) without aggregate variables = .308.

*Significant at 5 percent level or better.

We used the edited time lost which allows 16 hrs/day for the first 8 weeks, 12 hrs/day after that (lost from work or leisure). Will not affect the other coefficients.

Changes truncated to avoid erratic effects of a few cases:
Changes in head's hours: + 2000; change in hourly earnings: + $10,000.
Change in wife's hours: + 2000; change in head plus wife hours: + 4000.
Change in needs: + $5,000; change in other family income + $10,000.

aggregate changes mean that they all work indirectly through these individual variables (Figure 2.2). When we look at the effects of the three aggregate changes and the aggregate unemployment level in the second year, none of them have any important effects on any of the important individual variables, the correlations ranging from -.04 to +.04 and their squares (fraction of variance explained, from -.0016 to +.0016; path "A" in Figure 2.2. Thus, there is no purpose in displaying the details of such a path diagram, nor are the direct effects--the simple correlations of the aggregate data with change in individuals' hours (path "B" in Figure 2.2)--of much importance.

Two-Year Change

Concentrating on short-run year-to-year changes may be misleading if some effects on changes in work hours take longer to show up. We investigated this by looking at the changes from a given year to the second subsequent year--that is, from the first to the third, the second to the fourth--the third to the fifth, and so on through the eighth year to the tenth. The 1,519 unchanged families (same head and wife) thus experienced 12,152 changes, but the main results were unchanged (Table 2.8). They provide additional evidence of a dominant income effect. As a family's needs increase so do the family head's work hours, and as other family income increases the family head's hours decrease--suggesting that there is a desired real income level, particularly when the wife reduces her paid work to care for children. The constraints reflected by expressed desire for more or less work in the first or third year also indicated important influences.[11] Again, changes in aggregate (environmental) variables had nonsignificant and sometimes unexpected effects. Individual circumstances apparently dominate.

CHANGE IN WORK HOURS OF SPECIAL SUBGROUPS

The "Vulnerable"

To test the possibility that aggregate conditions have more powerful effects on young people who have neither education, seniority, nor experience, we re-ran the analysis for 214 families (1,954 year-to-year changes) where the head was under 35 in 1967 (the start of the period) and had completed less than 12 grades

---

[11] The reason we do not use changes in the wife's unemployment or illness is not out of current male chauvinism, but because (perhaps from past chauvinism) the data on wife's unemployment and missed work from illness was inadequate until the last few years of the study.

FIGURE 2.2
A PATH MODEL

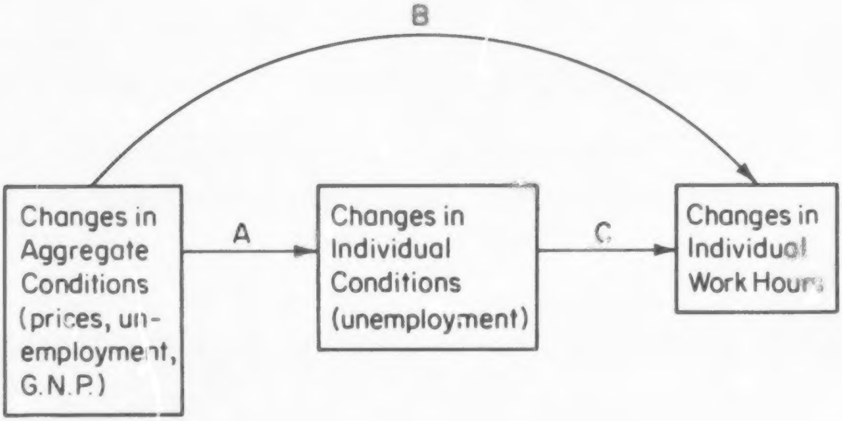

B
Changes in Aggregate Conditions (prices, unemployment, G.N.P.)
A
Changes in Individual Conditions (unemployment)
C
Changes in Individual Work Hours

Table 2.8 (Page 1 of 2)

CHANGES FROM EACH YEAR TO THE SECOND SUBSEQUENT YEAR WITHIN THE TEN-YEAR PERIOD AS A FUNCTION OF INDIVIDUAL AND AGGREGATE CONDITIONS

(For 12,152 changes for 1,519 families with the same head and wife all ten years and where the head worked at least 500 hours every year.)

Explanatory Characteristic	Change in Head's Hours		Change in Hours of Head and Wife	
	Regression Coefficient	T-Ratio	Regression Coefficient	T-Ratio
Change in:				
Head's hourly earnings	-83.5	40.4*	-88.7	25.7*
Head's hours unemployed	-0.97	41.2*	-.99	26.0*
Head's hours ill	-0.54	30.8*	-.55	19.3*
Wife's work hours	.0018	0.23	--	--
Family needs level	.0219	2.65*	.0214	1.64
Family income other than head's earnings	-.0044	3.20*	--	--
Cost of living	-.125	0.75	.248	0.92
Real national consumption	0.25	1.09	.557	1.51
National employment	0.65	1.76	.571	0.96

Table 2.8 (page 2 of 2)

Explanatory Characteristic	Change in Head's Hours		Change in Hours of Head and Wife	
	Regression Coefficient	T-Ratio	Regression Coefficient	T-Ratio
Level of:				
Aggregate unemployment	0.48	0.73	-.063	0.06
Head wanted more work 3rd year	-.104.5	8.32*	-84.3	4.17*
Head wanted less work 3rd year	33.4	2.70*	22.0	1.10
Head wanted more work 1st year	68.5	3.61*	81.5	2.67*
Head wanted less work 1st year	-99.8	5.22*	-110.5	3.58*
R adj		.285		.139

Changes truncated to avoid erratic effects of a few cases, as follows:
Change in head's hours: + 2000; changes in hourly earnings + $10.00.
Change in head's plus wife's hours + 4000; change in wife's hours + 2000.
Change in needs + $5,000; change in other family income + $10,000.

*Significant at 5 percent level or better.

Using the edited time lost which allows 16 hours a day for the first 8 weeks, then 12 hours a day (time lost from work or leisure).

of school. The results were the same and are not given in detail here. Aside from constraints represented by changes in illness or unemployment or by reports of wanting more or less work than was available, only changes in hourly earnings mattered.

The Unconstrained

A second possibility is that only those not dominated by constraints and pressures are free to respond to changes in incentives.[12] When we eliminated from the year-to-year change analysis data for persons whose hours of unemployment or illness changed by 40 hours or more and for those who reported wanting more or less work in either year, we were left with 5,064 year-to-year changes representing more than 562 families, since we eliminated only the non-free year-to-year changes. Again, the results were similar (Table 2.9), and income goals dominated in decisions about work hours. Rising wage rates led to fewer work hours.

For these families, however, the current aggregate situation did have significant effects on the total head-plus-wife work hours. A rising cost of living or an increase in aggregate real consumption led to more work, particularly for the wife, presumably to maintain standards of living. Increased aggregate unemployment was associated with less work in that year, particularly by wives. And change in aggregate numbers in the labor force was associated with fewer hours for each, again particularly for wives.

Finally, we checked on whether the "marginal" people free to make marginal choices might display a positive response to changes in wage rates over a longer period. We looked at the change from 1971 to 1976, eliminating those whose illness plus unemployment hours changed by 40 hours or more and those who in 1976 said they wanted more or less work. These 827 families also significantly reduced work hours in response to increases in wage rates. This was true both for head's work hours and for the total work hours of head and wife.

Some Qualifications

Just as reporting errors or random fluctuations can produce a spurious negative correlation between hourly earnings and work hours in a cross-section, so they can produce a spurious correlation between change in wage rate and change

---

[12] The use of measures of unemployment and illness, commuting burden, and wanting more or less work in the previous regressions does adjust for constraints but does not indicate whether only the unconstrained respond to other factors.

Table 2.9

YEAR-TO-YEAR CHANGE IN WORK HOURS
(For 5,064 instances where neither unemployment nor illness hours changed by 40 hours or more, and head did not report wanting more or less work either time.)

	Change in Head's Hours		Change in Hours of Head and Wife	
	Regression Coefficient b	Significance Level T-ratio	Regression Coefficient b	Significance Level T-ratio
Change in head's hourly earning rate	-95.54	30.29*	-108.37	22.80*
Change in wife's hours	.018	1.26	—	—
Change in needs	.021	1.24	.0069	0.27
Change in other family income	-.0038	1.87	—	—
Change in price level	.831	1.20	2.19	2.10*
Change in aggregate consumption	1.100	1.31	2.95	2.33*
Change in aggregate employment	-1.11	1.55	-3.94	3.66*
Level of unemployment	-0.97	1.48	-2.81	2.83*
R2 (adj.)	.154		.095	

*Significant at 5 percent level or better.

N=5064

in work hours. The effect is strongest for fluctuations in reported hours. We are correlating:

$$\frac{\text{earnings now/hours now}}{\text{earnings last year/hours last year}} \quad \text{with} \quad \frac{\text{hours now}}{\text{hours last year}}$$

A boost in last year's reported hours (e.g., from reporting errors) will decrease the left-hand term and increase the right-hand term, producing a negative shift in the estimated correlation. An upward fluctuation in last year's earnings (and wage rate) will decrease the left-hand term for that family but will not affect the right-hand term, producing a small reduction in the estimated correlation.

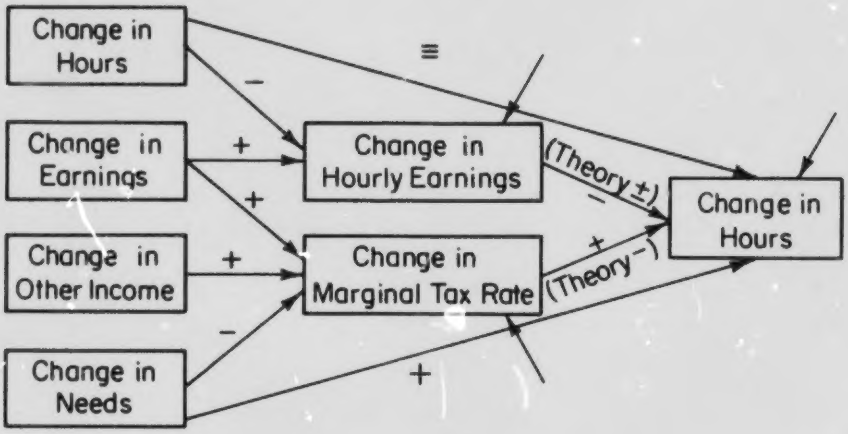
Recall, however, that when we used change in intramarginal wage we found the same negative effect on change in hours worked, and for all but a few that wage was not derived by dividing earnings by hours.

Another way of looking at the theoretical model--which could also explain why using the marginal tax rate in our static regressions led to such dramatic increases in the negative wage effect--is shown in Figure 2.3, with its feedback loop. In such a model, ordinary multiple regression cannot provide proper estimates. Not only are there causal relations among some of the variables we have used to "explain" changes in hours, but there is also at least one circularity or feedback loop, because change in hours is in the denominator of change in hourly earnings. In addition to the misspecification problem, there is a simpler statistical difficulty. With substantial sample sizes, high intercorrelations among explanatory variables can lead to large increases in estimated coefficients, sometimes with the sign reversed. And the estimated standard errors of the coefficients do not increase enough to warn us of difficulty, so a mechanical reliance on significance tests is not enough.

There is yet another way in which change in average earnings is correlated with change in hours, but with a different causal interpretation. Some people have second jobs which pay less than the main job, so working more would mean lower average earnings, and vice versa. In this case our conclusion about the dominance of the income effect would have to be qualified. But a few second jobs and most overtime work hours pay more than the regular time, so an increase in work hours could be associated with increased hourly earnings, regardless of whether the higher marginal wage induced the extra work, and the dominance of the income effect would be even stronger than our estimates indicate.

FIGURE 2.3

A THEORETICAL MODEL OF CHANGES IN HOURS


Change in Hours
≡
−
Change in Earnings
+
+
Change in Hourly Earnings
(Theory ±)
−
Change in Hours
Change in Other Income
+
Change in Marginal Tax Rate
+
(Theory −)
−
Change in Needs
+

Analysis of Residuals

A different identification problem arises with the effect of aggregate conditions on individual work. Changes in aggregate conditions can affect individuals indirectly by raising the threat of unemployment or the cost of living or directly by leading to individual unemployment or underemployment or to individual wage increases. In this situation there is an argument for removing the effect of the individual variables like change in hours of unemployment to see whether the aggregate variables affect the residuals.[13] To do this we estimated a regression with the expected change in the family head's hours as the dependent variable, generated the residuals, and then ran the residuals against the aggregate variables.

The initial regression used the pooled year-to-year changes (13,671 changes for 1,519 families) as in Table 2.7 but with a selected set of individual predictors:

Expected change in hours = −34 − 94.7 (change in wage in cents) − .925 (change in unemployment in hours) − .499 (change in of illness)

−90.9 (if more work was wanted in second year) + 84.6 (if less work was wanted in second year)

+41.6 (if more work was wanted in first year) − 42.5 (if less work was wanted in first year)

−.0026 (change in other family income in dollars) + .0144 (change in needs in $) + .004 (change in wife's hours)

The first seven predictors were significant; the last two were not but were in the expected direction for needs, with the wife's increased hours accompanying the husband's.)

We then looked at whether changes in aggregate conditions affected the residual changes in the family head's work hours--unexplained by individual unemployment, wage rates, and so on (Table 2.10).

Aggregate conditions clearly can affect individual unemployment or individual changes in wages, but they apparently do not have an additional, separable effect on work hours directly. Nor did increased cost of living induce a statistically significant increase in work hours, though the coefficients

---

[13] That is, do they have any effect that does not operate by altering individual unemployment or availability of work.

Table 2.10

REGRESSION OF RESIDUAL CHANGE IN THE FAMILY HEAD'S WORK HOURS, UNEXPLAINED BY INDIVIDUAL CONDITIONS OR CHANGES
(For 13,671 changes among 1,519 families.)

Explanatory Variable (%)	Regression Coefficient B	Significance Level t-ratio
Relative increase in cost of living	2.59	0.65
Relative increase in consumer expenditures	6.67	1.36
Relative change in aggregate employment	-0.21	0.49
Level of unemployment	-1.90	0.05

R^2(adj.) = .000

indicate that a 10 percent increase in cost of living might raise annual work hours by 26 hours. Similarly, a 10 percent increase in aggregate consumer expenditures (in real dollars) would appear to result in a (non-significant) increase in annual work hours of 67 hours. With an even wider range of uncertainty a 10 percent increase in aggregate unemployment decreases individual work hours (adjusted for individual unemployment) by 19 hours, and a 10 percent increase in the aggregate number of people employed reduces annual work hours by two hours (spreading the work so that some lose overtime).

Of course, more efficient statistical procedures that took account of the interrelations among the error terms would have reduced the sample error estimates and raised the significance levels.

Comparative Elasticities--Short and Long Run

It is useful to compare the various estimates of the effects of changed hourly earnings on changes on work hours. Since most such comparisons are made in elasticity terms, Table 2.11 gives both the regression coefficients and the elasticities evaluated at the means. The latter involves some compromises, since only in the cross-section data is there a single mean wage rate and mean hours. We have used the means at the beginning of the period for the 1967-1971 and 1971-1976 change data, and the ten-year average of the means for the year-to-year pooled estimates and for the year-to-year-plus-one pooled estimates.

The results are rather dramatic: e.g., the elasticities get progressively larger (negative) the shorter the time period allowed for adjustment, assuming that cross-section data reflect the longest-term estimates. The implication is that the negative income effects are immediate and short-run and are then gradually eroded by continuing increases in standards of living and rising aspiration levels (or, in the case of decreases in real wages, by adaptation). Cross-section data thus underestimate the short-run effects of wage changes on work hours, because people at higher wage levels have had a chance to get used to the wage changes, increase their consumption desires, and take overtime or second jobs again in order to satisfy those desires. But short-lived experiments may exaggerate the longer-run reduction in work hours (after people get used to more money). However the knowledge that the experiment is temporary may *reduce* people's willingness or desire to change.

If changes in hourly earnings were the *result* of higher pay for overtime, these negative income effects are even more striking. If the negative association of wage rates with hours is because second jobs pay less, the

Table 2.11

A COMPARISON OF ESTIMATED EFFECTS OF WAGE RATE ON HOURS

Regression Source of Estimate		Regression Coefficeint (Hours/Wage Rate)	Elasticity*
1976 Cross-Section	(See Table 2-3)	-.17	-.05
Five year change, 1971-1976	(See Table 2-4)	-.35	-.06
Four year change, 1967-1971	(See Table 2-4)	-.66	-.09
Pooled two-year changes	(See Table 2-8)	-.84	-.18
Pooled year-to-year changes	(See Table 2-7)	-.95	-.20

*Evaluated at average wage and hours for line 1, at average initial wage and hours for lines 2-3, and at ten-year average of average wage and hours for lines 4-5.

implication remains that people work less when they can "afford to," but the size of the effect is exaggerated somewhat. And of course measurement errors which can produce spurious negative correlations between hourly earnings and hours, or between changes in the two, are likely to be more important relative to the smaller year-to-year changes than for the larger longer-term changes.

Specification Bias Possibilities from Ignoring Constraints

The importance of constraints affecting work hours, represented here by hours of reported illness or unemployment and by expressions of desire for more or less work, is not just that they account for much of the change in work hours, but that omitting them may affect other estimates through misspecification bias. The extent of such bias depends on how much correlation there is between other variables in the model which affect hours and the constraint variables. Table 2.12 gives some of the relevant correlations for the cross-section data and for the two regressions on change during 1967-1971 and 1971-1976. There are substantial correlations of hours of unemployment, illness, and wanting more work with age, education, race, and marital status. But changes in unemployment or illness are not correlated with any of them. Wanting more work appears to be correlated with the demographic variables in a reasonable and substantial way.

More direct evidence on the effect of ignoring constraints is provided by asking what effect adding the constraint variables has on the estimated effects on hours of wage rate and of the demographic variables. Table 2.13 shows that the estimated effect of wage rate or change in wage rate on hours or change in hours is largely unaffected by whether one takes account of the constraints. But the estimated effects of education and race are substantially reduced, implying that they operate through unemployment, illness, and inability to choose one's own work hours, rather than through effects on the desired supply of labor.

Summary

We found, then, that people are dominated by an income goal and by constraints on their ability to work to achieve it. Changes in work hours from one year to the next (or to two or five years later) were in large part the result of changes in unemployment, illness, and under- or over-employment as reported by the respondents.

But even more important was the negative effect on work hours of an increased wage rate, or the positive effect of failure of wages to rise. All this betokens a desire for a specific amount of income which can be met with less

Table 2.12 (page 1 of 2)

CORRELATES OF CONSTRAINTS WITH OTHER COMMON EXPLANATORY VARIABLES
CROSS SECTION 1976

	AGE	AGE2	EDUC.	RACE (BLACK)	MARRIED
Unemployment hours	-.15	-.14	-.12	.05	-.11
Illness hours	-.01	-.02	-.09	+.06	.01
Want more work	-.14	-.14	-.14	.07	-.01
Want less work	.00	.00	.00	.00	-.03
Child care problems	-.18	-.17	.04	.09	-.34
Average hourly Earnings	.19	.16	.28	-.11	.10
Hours	-.06	-.09	.09	-.07	.10
1967-1971			CHANGE 1967-1971		
Change in unemployment	-.07	-.07	.02	-.03	.02
Change in illness	-.01	-.01	-.01	.00	-.02
Wanted more work in 1971	-.10	-.11	-.14	.08	.02
Wanted less work in 1971	.01	.01	-.03	-.01	-.01
Wanted more work in 1967	-.01	-.03	-.14	.08	-.002
Wanted less work in 1967	.01	.00	-.01	-.01	-.05
Change in hourly earnings	-.05	-.06	.15	.04	.08
Change in hours	-.19	-.19	.09	.00	-.07

Table 2.12 (page 2 of 2)

1971-1976	AGE	AGE2	EDUC.	RACE (BLACK)	MARRIED
1967-1971			CHANGE 1967-1971		
Change in unemployment	.00	.00	-.02	.00	.03
Change in illness	.04	-.04	.02	.01	.01
Wanted more work in 1976	-.12	-.12	-.15	.09	.01
Wanted less work in 1976	.01	.01	-.01	-.02	-.04
Wanted more work in 1971	-.09	-.10	-.17	.07	.02
Wanted less work in 1971	.04	.03	-.03	.03	.00
Change in hourly earnings	-.07	0.07	.18	-.05	.07
Change in hours 1971-1976	0.15	0.15	0.04	-.01	0.03

10.

Table 2.13

EFFECTS ON REGRESSION COEFFICIENTS AND T-RATIO
WHEN CONSTRAINTS ARE ADDED
(For household heads.)

	Hours 1976 Cross-section				Change in Hours							
					67-71				71-76			
	Without Constraints		With Constraints		Without Constraints		With Constraints		Without Constraints		With Constraints	
	b	t	b	t	b	t	b	t	b	t	b	t
Hourly earnings	-.19	8.2	-.18	8.7	-75.5	17.8	-72.4	18.5	-41.8	11.8	-37.7	11.6
Age	55	11.9	50	12.0	-1.9	0.3	1.1	0.2	-13.7	1.8	-.8	1.3
Age-squared	-0.67	12.8	-0.67	13.9	-.10	1.54	-.15	2.6	0.05	0.6	-.01	0.2
Education	25.0	6.4	5.1	1.4	+34.9	6.0	34.7	6.4	9.9	2.1	6.4	1.5
Black	-99.5	2.6	-63	1.8	-3.1	0.07	-22.4	0.6	-53.0	1.1	38.3	0.9
Married	100.0	6.4	126	4.4	-101.8	3.3	-120.2	4.2	8.8	0.3	10.6	0.3
R^2(adj.)	.10		.26		.13		.26		.07		.23	

work when wages rise faster than the cost of living and which requires overtime and an extra job when wages do not keep up with inflation. This inference is supported by other research. An entirely different approach to the income-leisure substitution question was used by Dunn, who asked textile workers in a cotton-mill town in the southeast about each of several non-wage fringe benefits, first, how many extra hours they would work to get each and, second, how much less salary they would take if they were included. The comparison of the two gave substitution rates far lower than the actual wage rate, also indicating target income.[14]

The aggregate variables were barely significant in our analysis, presumably because differences in inflation or expanding employment were sufficiently small from year to year, compared with the huge individual differences in wage rate or availability of work which affected an individual's own unemployment.

The differences between the long-run (cross section) and short-run (panel change) estimates of elasticities dramatize the dangers of attempting to infer dynamic responses from (static) cross-section data, or even from short-lived experiments.[15] The possibility of temporary reductions in work effort seems to have been overlooked in the discussions of inhibition of change because of the temporary nature of the experiments.

This preliminary analysis leaves much to be done in determining exactly how income aspirations change over time in response to changes in family needs and national standards. One would need more specific data on exactly how many work hours people have in mind when they say they want more or less work, and on whether those who say they want more work are thinking of earning their average wage for the extra hours. For the unemployed or ill, one would have to determine whether the lost time measured the departure from desired income levels, ignoring any expressed desires for more or less work. One might even need to distinguish the differential changes in aggregate employment and unemployment by states or counties, rather than as a single national aggregate. The absence of any evidence of compensating behavior to offset the time lost through unemployment or illness may well reflect the fact that actual losses are only the visible manifestation of poor health or a slack job market which in turn make compensating overtime or extra jobs more difficult than usual or perhaps the compensation takes place only after a lag, if at all.

---

[14] L. F. Dunn, "An Empirical Indifference Function for Income and Leisure," *Review of Economics and Statistics* 60 (November, 1978), 633-540.

[15] Michael C. Keeley, Philip K. Robins, Robert G. Spiegelman, and Richard W. West, "The Estimation of Labor Supply Models Using Experimental Data," *American Economic Review* 68 (December, 1978) 873-887. See also Gary Burtless and David Greenberg, "The Limited Duration of Income Maintenance Experiments and Its Implications for Estimating Labor Supply Effects of Transfer Programs," Technical Analysis Paper No. 15, Office of Income Security Policy, Office of the Assistant Secretary for Planning and Evaluation, U. S. Department of Health, Education and Welfare, October 1978; Philip K. Robins and Richard W. West, *A Longitudinal Analysis of the Labor Supply Response to a Negative Income Tax Program: Evidence from the Seattle and Denver Income Maintenance Experiments*, Research Memo 59, Center for the Study of Welfare Policy, Stanford Research Institute, Menlo Park, California, December 1978; and John F. Cogan, *Negative Income Taxation and Labor Supply: New Evidence from the New Jersey-Pennsylvania Experiment*, Rand Report R-2155-HEW, February 1978.

A better theory and additional research on aspirations levels and target incomes seems more crucial at this stage than further attempts to tease out measures of a substitution effect of changed wage rates. The latter is bound to be of trivial importance relative to the changing income goals that families set for themselves.

Chapter 3

AN EMPIRICAL MODEL OF WAGE GROWTH

Greg J. Duncan

INTRODUCTION

Most of our knowledge about patterns of wage change over the life cycle has been based on evidence from cross-sectional data. The smooth, parabolic age/earnings profile that is cited as support for the human capital model of self-investment is derived by comparing the earnings of different individuals of different ages. It is assumed that other characteristics which affect earnings can be statistically controlled and that the next year's earnings for individuals of age t (or with years of experience t) can be predicted by looking at the current earnings of other individuals of age (or experience) t + 1. These age/earnings profiles have generally been flatter for blacks than for whites.[1] Recent longitudinal studies with earnings data on the same individuals over time have shown that the actual pattern of earnings is much more chaotic than pictured in the cross section. Hoffman, for example, examined Panel Study data and found that "even with a generous allowance for possible measurement error, the results suggest an upper-bound estimate for just over a quarter of the sample with monotonic increases in nominal earnings (over an eight-year period) and just over ten percent with (monotonic) increases in real earnings" (1977, p. 245). Schiller analyzed earnings histories from Social Security data and found "tremendous variation in the shape of individual earnings profiles" (1977, p. 927).

Longitudinal data provide an opportunity to analyze not only the patterns of wage change but also their possible causes. Dickinson (1974) did some exploratory work in modeling wage change with the Panel Study data and found that the conventional predictors of wage level accounted for no more than one-tenth of the variance of wage change. Hanushek and Quigley (1978) also analyzed wage changes with Panel Study data. They estimated a conventional human capital model

---

[1] Part of the flatter slopes may be due to so-called "vintage" effects. See Smith and Welch (1977) and Hoffman (1978).

108

which was modified to explain wage changes and concluded that the implied rates of return to investment in on-the-job training were unreasonably low. Lazear (1976) used data from the National Longitudinal Study of Young Men to estimate a different version of a human capital model of wage change. He obtained reasonable estimates for the effects on wages of periods of nonwork, experience, and aging. Andrisani (1977) found that the attitudinal variable of internal-external control has some significant effects on the earnings growth of young and middle-aged men in the National Longitudinal Studies.

The focus of this past work was on testing whether a limited subset of independent variables affected wage growth. Additional variables were added in a rather ad hoc fashion with little regard for the possibility that some of them, in particular the measures of changes in job characteristics or location, might be intervening variables which would help explain the way in which the other independent variables operated. Education, for example, may affect wage growth by leading to beneficial job changes or geographic mobility. If measures of the changes are included in the wage growth equation, then the total effect of education on wage growth may be understated. A more reasonable model of wage growth is a recursive one in which such initial state variables as education, initial experience, and attitudes constitute the first stage, and where measures of subsequent change in experience, jobs, or geographic location play the role of intervening variables which help to explain how the initial variables operate to affect wage growth. Such a general model of wage growth can test simultaneously many of the hypotheses set forth by psychologists and by the proponents of human capital and segmented labor market theories.

This chapter proposes and tests such a general descriptive model of wage change. Actual patterns of wage change from 1971 to 1976 are described in the next section. The model is explained in the third section, with empirical results presented in the fourth section. The fifth section discusses the relative importance of the different sets of explanatory variables in explaining racial differences in growth rates. A summary section is included at the end of this chapter.

The sample used in this analysis consists of male household heads, age 23-38 in 1972 who reported themselves as employed or unemployed[2] (students and disabled persons were excluded) in each of the years between 1972 and 1977, who worked at least 250 hours in each of those years, and whose calculated wage rates ranged between \$.50 per hour and \$25.00 per hour in each of the years 1971-1976. The lower age limit was placed to avoid including (and excluding) men who might still be in school. The upper age limit restricts the sample to younger workers in the early years of their careers yet provides enough observations for analysis. Thus, the sample included 921 respondents in all--701 whites and 220 blacks.[3]

---

[2] Unemployment here does not correspond to the conventional definition since respondents do not have to have reported looking for work in the past four weeks.

PATTERNS OF WAGE GROWTH, 1971-1976

Between 1971 and 1976, the average real hourly earnings of the men in our sample grew from \$4.46 to \$5.22--a 17 percent increase.[4] These averages conceal large fluctuations in individual growth rates, however.

If the wage rate of an individual grows exponentially from time 0, then the wage rate at time t, W_t, can be expressed as

$$(1) \quad W_t = W_o e^{rt}$$

where r is the instantaneous growth rate. Taking the natural logarithm of both sides

$$(2) \quad \ln W_t = \ln W_o + rt$$

An estimate of the earnings growth rate, r, can be obtained for each individual in the sample by calculating the slope of a regression line fit through the six observations of the natural logarithm of real wage rates between 1971 and 1976.[5] The variable constructed this way is called "Trend in *ln* Wage." The average value of this variable for the entire sample is .023, indicating an instantaneous growth rate of 2.3 percent and an annual growth rate of 2.3 percent.[6] The

---

[3] The "white" category includes all racial groups other than blacks. The *weighted* portion of blacks in the sample is 7.3 percent.

[4] All wage observations have been deflated by the CPI back to 1971.

[5] Computationally, this slope is a weighted sum of the six wage rates:

$$[(-2.5 \cdot \ln 1971 \text{ wage}) - (1.5 \cdot \ln 1972 \text{ wage}) - (.5 \cdot \ln 1973 \text{ wage}) + (.5 \cdot \ln 1974 \text{ wage}) + (1.5 \cdot \ln 1975 \text{ wage}) + (2.5 \cdot \ln 1976 \text{ wage})] \div 17.5.$$

This follows directly from the formula for computing a simple regression coefficient with the six annual measures of time scaled as -2.5, -1.5, -.5, .5, 1.5, and 2.5, respectively.

[6] The percentage change in W from time t to time t + 1 can be expressed as follows:

$$\frac{W_{t+1} - W_t}{W_t} = \frac{W_o e^{r(t+1)} - W_o e^{rt}}{W_o e^{rt}} = \frac{W_o e^{rt}(e^r - 1)}{W_o e^{rt}} = e^r - 1$$

In the case of $r = 2.3\%$, $e^r - 1 = .0233$.

standard deviation of this variable is very large however, .087, and individual growth rates range from -.425 to .373. Although part of the variation in this measure of wage growth may be due to measurement error, an examination of many of the outlying observations showed that most were the result of unusual--but apparently real--circumstances.[7]

Table 3.1 shows the averages of various definitions of wage growth by race and age. Altering the definition of change by including only the end years, averaging the pairs of end years or even just looking at two-year change has little effect on the results. Young whites (age 23-30) had the highest average rates of earnings growth, followed by young blacks, older whites (age 31-38) and older blacks, respectively. The race-age classification accounts for very little of the variance of the wage growth measures, however, and is statistically significant at the five percent level or below for only two of the four measures.

The higher growth rates for whites would seem to indicate an increasing racial gap in relative earnings. The remaining numbers on Table 3.1 show that this is not the case, however, due to the skewed distribution of the wage growth variable. The ratio of average earnings of blacks to whites fluctuates considerably from year to year but shows no consistent trend over this six-year period. The 1972 and 1974 average earnings ratios obtained from Current Population Survey (CPS) data by Smith and Welch (1978) are also shown on the table. Those data are not exactly comparable because the age range is somewhat different and they used two independent cross-sections while we use longitudinal data on the same individuals.

The pattern of intercorrelation among the six observations on hourly earnings are shown in Table 3.2. The correlations below the diagonal are for whites and those above the diagonal are for blacks. As might be expected, correlations are generally highest for adjacent years for both racial groups. In addition, the correlations are consistently higher for whites than blacks, implying greater stability over time in the earnings of whites.

---

[7] For example, large increases in wage rates resulted from a change from a low paid army instructor to a highly successful self-employed businessman and a change from an unsuccessful real estate salesman to a successful landscaper. Large decreases in wage rates were due, for example, to a change from a union carpenter to a self-employed businessman working long hours and a change from a highly paid air force captain to a dairy farmer.

Table 3.1

MEASURES OF EARNINGS LEVELS AND CHANGES BY RACE AND AGE

(For all male household heads, age 23-38 in 1972.)

	Trend in ln Wage	ln 76 wage- ln 71 wage	ln $\frac{75+76\text{-wage}}{2}$ -ln $\frac{71+72\text{-wage}}{2}$	ln 72- ln 71		Average Hourly Earnings 1971	1972	1973	1974	1975	1976	Unweighted Number of Observations
White, age 23-30	.031	.198	.111	.103		$4.02	$4.44	$4.68	$4.64	$4.63	$5.01	421
					Black-White Ratio	.83	.80	.83	.88	.77	.82	
							(.765)[a]		(.760)[a]			
Black, age 23-30	.021	.165	.070	.076		3.35	3.54	3.38	3.94	3.55	4.09	119
White, age 31-38	.014	.091	.060	.065		5.20	5.42	5.64	5.82	5.57	5.71	280
					Black-White Ratio	.70	.67	.64	.63	.70	.67	
							(.654)[b]		(.688)[b]			
Black, age 31-38	.012	.041	.051	-.008		3.62	3.65	3.33	3.65	3.89	3.82	101
All	.023	.147	.087	.082		$4.46	$4.78	$5.01	$5.06	$4.95	$5.22	921
Eta2	.009*	.013**	.005	.005		.071**	.061**	.053**	.065**	.052**	.028**	

*Significant at .05 level.

**Significant at .01 level.

[a] Smith-Welch (1978, p. 7) estimate for 21-30 year olds.

[b] Smith-Welch (1978, p. 7) estimate for 31-40 year olds.

Note: All wage rates have been deflated by change in the CPI since 1971.

Table 3.2

SIMPLE CORRELATIONS (r) AMONG MEASURES OF AVERAGE HOURLY EARNINGS, BY RACE

(For male household heads, age 23-38 in 1972.)

	1971	1972	1973	1974	1975	1976
1971 wage	1.0	.56	.48	.47	.61	.43
1972 wage	.83	1.0	.57	.57	.55	.53
1973 wage	.76	.80	1.0	.72	.53	.64
1974 wage	.72	.78	.77	1.0	.51	.67
1975 wage	.70	.76	.73	.75	1.0	.68
1976 wage	.58	.61	.59	.64	.75	1.0

Note: Correlations below the diagonal are for whites, correlations above the diagonal are for blacks.

A MODEL OF WAGE GROWTH

The human capital and segmented theories of labor markets point to two different mechanisms for generating wage growth. Central to the human capital earnings model is the notion that changes in earnings are caused by changes in the stock of skills possessed by the individual worker. Skills are increased through a worker-controlled investment process which may take many forms. On-the-job training, labor market information, geographic and job mobility, and health are often cited as types of investments but the relative frequency and importance of them has not been established. Since the most important investment--on-the-job training--has not been measured, the strategy followed in empirical work is to specify a functional relation between the unobserved changes in on-the-job training and such observable measures as work experience, age, and schooling. Lazear (1976), for example, estimates a wage growth model for young men based on the two following equations:

$$(3) \quad \gamma_i = \alpha_o + \alpha_1 (S_{t+1} - S_t) + \alpha_2 (OJT_{t+1} - OJT_t)$$

and

$$(4) \quad OJT_{t+1} - OJT_t = \delta_1 (Exp_{t+1} - Exp_t) + \delta_3 S_t + \delta_4 \, Age$$

where γ_i = average annual growth rate in the wage rate

S_t = years of schooling in time t

OJT_t = years of on-the-job training in time t

Exp_t = years of labor market experience in year t

Age = age in year t

In these two equations, changes in the stock of skills and, hence, wages are a function of the opportunity for investment (as measured by the amount of experience acquired between time t and t+1) and of a set of initial conditions that are thought to affect the profitability of an investment in on-the-job training. Substitution of Equation 4 into Equation 3 gives an equation that can be estimated.[8] Little is known about the determinants of investment in on-the-job training listed in Equation 4. The life-cycle investment models point to the potential importance of the variables that Lazear includes, but others have argued for the potential importance of other kinds of factors. Andrisani (1977), for example, provides empirical evidence that links wage growth to an individual's internal-external attitudes. Those who perceive success as being related to personal effectiveness and ability are thought to be more likely to "invest in greater amounts of and more valuable types of human capital, and more effectively utilize the talents they come to possess" (1977, p. 311). Similar arguments have been made for the potential importance of achievement motivation.[9]

---

[8] Hanushek and Quigley (1978) assume two alternative relationships between investment and labor force experience and then estimate the implied rates of return.

The writings of proponents of segmented labor market models, although quite diverse (see Cain, 1976), point to the potential importance of the characteristics of the industry of employment in affecting wage growth. Jobs in the primary sector are thought to be more secure and to provide greater wage growth, although the rate of promotion and growth are dictated by the job rather than by the individual worker. Secondary sector jobs have the opposite characteristics. One's chances of selection into the primary sector are a function of race and sex as well as some behavioral patterns developed from past employment. On this latter point, Piore (1970) has argued that working in the secondary sector develops poor working habits which, in turn, tend to prevent advancement to the primary sector. These theories have several testable implications for a model of wage growth. First, the rate of growth in earnings should be highest among those remaining in or entering primary sector jobs, and may be largely independent of the human capital variables discussed earlier. Second, measures of undesirable work habits should lead to lower wage growth by keeping individuals in secondary sector jobs.

The wage growth model used here is a general one which incorporates many of the hypotheses of the human capital, segmented labor market, and psychological theories. It is depicted in Figure 3.1 and can be represented in equation form as:

(5) $\ln 1971 \text{ wage rate} = f(\text{Background})$

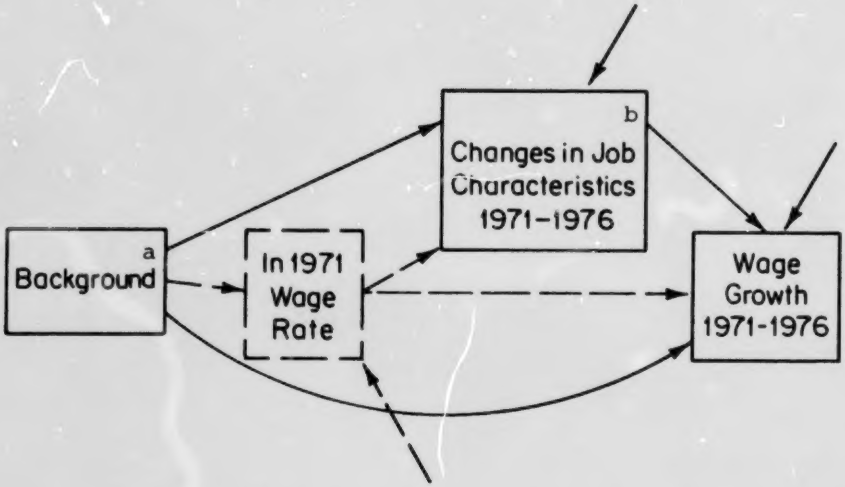
(6) $\text{Change in job characteristic}_j = g_j(\text{Background}, \ln 1971 \text{ wage rate})$

(7) $\text{Wage growth} = h(\text{Background}, \ln 1971 \text{ wage rate}, \text{Changes in job characteristics})$

---

[9] See, for example, Atkinson and Feather (1965).

FIGURE 3.1
MODEL OF WAGE GROWTH


Background
a
In 1971
Wage
Rate
b
Changes in Job
Characteristics
1971-1976
Wage
Growth
1971-1976

[a] (1) Years of education; (2) work experience in 1972; (3) test score; (4) achievement motivation; (5) self-reported efficacy; (6) how often late? (7) how often absent? (8) ln city size in 1972; (9) whether South in 1972.

[b] (1) Number of promotions; (2) number of quits; (2) number of involuntary job changes; (4) change in work hours; (5) number of job-related moves; (6) six-year unemployment; (7) change in union status; (8) change in self-employment status; (9) change in durable manufacturing status.

where "Background" consists of the following variables:[10]

1) Years of education as reported by the respondent in 1976.
2) Work experience in 1972--a measure of years worked since age 18 as reported in 1975 but adjusted back to 1972.
3) Test score--total score on a 13-question sentence completion test administered to the respondent in 1972.[11]
4) Achievement motivation--total score on a 16-question sequence designed to measure achievement motivation.
5) Efficacy--total score from the 1972 interview on three questions concerning the extent to which the respondent carried out plans, is sure life will work out the way intended, and finishes things (maximum score is 15).
6) How often late.--response to the questions "Are there times when you are late getting to work?" and "About how often does that happen?" (scored in number of times per month).
7) How often absent?--response to the question "Are there times when you don't go to work at all, even though you are not sick?" and "How often does that happen?" (scored in number of times per month).

---

[10] Long as these lists of variables may appear, there were a substantial number of variables which were eliminated from the analysis because of consistently insignificant results or because results were based on a very small number of observations. "Background" variables that were dropped include the unemployment rate of the county of residence in 1972, the future orientation of the respondent, years out of the labor force since age 18, whether the interviewer reported that the respondent had language problems, whether the respondent had served in the military and did not acquire job-related skills while in the military, and scores on the "connectedness" and "risk avoidence" indexes. The "Change in Job Characteristics" variables which were eliminated include hours of work lost due to illness, change in second job status, change in marital status, change in whether the respondent reported working for the government, and change in white/blue collar occupation. In addition nonlinearities in initial work experience and change in work hours were investigated. To see if the regression results were sensitive to individuals with very large positive or negative wage growth, Equation 7 was estimated with the wage growth dependent variables truncated at plus and minus one standard deviation from the mean. The size and statistical significance of coefficients changed very little.

[11] Veroff et al. (1971) document the test score and achievement motivation indexes.

8) ln city size (in 1972).

9) Whether South (in 1972).

"Change in Job Characteristics" consists of the following variables:

1) Number of promotions--a count of the number of times the respondent changed jobs because of a promotion, as reported in the 1975, 1976, or 1977 interviews (maximum possible score is three).

2) Number of quits--a count of the number of times the respondent quit jobs, as reported in the 1972-1977 interviews[12] (maximum possible score is six).

3) Number of involuntary job changes--a count of the number of times a respondent lost his job because the company went out of business, because he was laid off or fired, or because of a strike or lockout, 1972-1977 (maximum possible score is six).

4) Change in work hours--the difference between the 1977 and 1972 responses to the question "On the average, how many hours a week did you work on your main job last year?"

5) Number of job-related moves--a count of the number of times a respondent reported changing residence for a job-related reason (maximum possible score is six).

6) Six-year unemployment--the sum of reported hours of unemployment in 1971 through 1976, divided by 12,000.

7) Change in union status--a set of dichotomous variables based on responses to union status questions asked in 1972 and 1977.

8) Change in self-employment--a set of dichotomous variables based on responses to self-employment status questions asked in 1972 and 1977.[13]

"Wage growth" is measured in two ways:

1) Trend in ln wage rate--the slope of the simple regression line of deflated ln wage rates from 1971 through 1976 on time.

2) ln 1976 wage - ln 1971 wage--the difference between the natural logarithm of the deflated wage rates at the beginning and end of the period.

---

[12] In the 1972, 1973, and 1974 interviews, quits and promotions were combined into one code category and are counted here as quits.

[13] Those unemployed at the time of the interview were asked about their most recent jobs.

To facilitate the estimation of the model, it was assumed that f, $g_j(j=1,\ldots,9)$, and h are linear and additive, that the error term associated with each equation is independent of the variables in that equation, and that the error terms are independent of one another. Some possible nonlinearities were examined and are discussed below.

The model assumes that the background variables affect wage growth in a number of ways. The total effect of a particular background measure is calculated net of the effects of other background variables. This total effect can be decomposed into the sum of (a) the direct effect of the background variable which has been adjusted for the effect of initial wage rate and changes in job characteristics; (b) an indirect effect which comes about because the particular background variable affects the initial wage rate and the initial wage rate in turn has a direct effect on wage growth; and (c) an indirect effect operating through changes in job characteristics. These direct and indirect effects may not account for the entire total effect because various second-order effects are possible. A background variable, for example, may affect the initial wage rate, which in turn may affect change in job characteristics, which in turn affects wage growth. Such second-order indirect effects are miniscule for the model estimated here and so are ignored.

The advantage of this kind of recursive model is that it helps to clarify the process of wage growth. Finding that initial work experience affects wage growth (as Lazear does) or that efficacy affects wage growth (as Andrisani does) tells little about how these background variables operate. Including the measures of changes in job characteristics in a separate stage in the model allows us to identify the ways in which these background variables work. If efficacy affects wage growth by promoting investment in training or mobility, then there should be strong indirect effects of efficacy on wage growth operating through promotions, quits, or geographic mobility. If bad working habits inhibit wage growth by relegating individuals to jobs in the secondary sector, then this should be indicated by indirect effects of the bad habits on wage growth operating through involuntary job changes and through changes in industry and union status.

The human capital explanation of wage growth would be supported if the indicators of voluntary investment activity (e.g., quits and job-related moves) have relatively important effects on wage growth. The background variables of education, work experience, and test score might also be expected to have an association with wage growth. Persons with more education or higher test scores would invest more if their increased skills or ability made it cheaper for them to do so, although this is not an unambiguous prediction from the human capital model. Those with more initial experience would be expected to invest less. If initial education, experience, and test score do indeed affect wage growth by increasing human capital investment, then there should be important indirect effects of these variables operating through the indicators of voluntary investments.[14]

The segmented labor market theories would be supported if the institutional measures of job change (i.e., changes in union status and industry) are relatively important predictors of wage growth. Finding that those joining unions or taking jobs in durable manufacturing industries have higher wage growth rates is also compatible with the notion that their higher wages may be offset by less desirable working conditions.[15] A more rigorous test of the segmented labor market theories is whether those remaining in unions or in durable manufacturing industries also do better financially.

To the extent that bad work habits characterize workers in secondary jobs, we would expect that the "How often late?" and "How often absent?" variables would have a detrimental effect on wage growth. Furthermore, since these habits supposedly lock workers into secondary sector jobs, we would expect them to operate through the intervening variables which characterize primary and secondary sector jobs.

Finding that the attitudinal variables of achievement motivation and efficacy affect wage growth would support the psychological theories that have been advanced about them. The intervening variables should help in understanding whether they operate through voluntary self-improvement (e.g., quits and job-related geographic mobility), through avoidance of detrimental labor market events (e.g., involuntary job changes, unemployment), or through institutional channels (e.g., change in union status or industry).

---

[14] The ideal intervening variable would be a measure of change in the stock of skills between the beginning and end of the six-year period. A question on the amount of job training received was included in the 1976 questionnaire and an attempt was made to calculate the change in training by subtracting the average training associated with the 1972 occupation. The results were not successful, probably because of the measurement error associated with the 1972 training measure. The training question was asked again in the 1978 interview, however, and changes between 1976 and 1978 can and will be studied when those data are available.

[15] See Duncan and Stafford (1978).

The means and standard deviations of the variables used in the wage growth model are listed in Table 3.3. Many of the racial differences have been documented before: blacks have less education than whites, live in larger cities, and are more likely to live in the South. Blacks also score lower on the sentence completion test and on both attitudinal measures and are more likely to report being late or absent from work. With regard to the measures of job change, whites are much more likely than blacks to be promoted, to quit, or to make a job-related move and are much less likely to experience an involuntary job change or unemployment. There are also some racial differences in the union, self-employment, and industry change variables--with blacks being more likely to join or remain in a union and much less likely to be self-employed at either the beginning or end of the period under study.

RESULTS

The wage growth model was estimated separately for whites and blacks since the hypothesis of equality in the structure of the coefficients was rejected.[16] Results are presented first for the intervening job-change variables, next for the initial wage, and finally for the background variables.

Changes in Job Characteristics

The estimated effects of changes in job characteristics on wage growth were obtained by regressing the two wage growth variables on the measures of changes in job characteristics, the natural logarithm of the initial wage rate, and background variables.[17] The estimated coefficients (and, in parentheses, the standard errors) are shown in Table 3.4. In general, these change variables account for substantial amounts of the variance in the growth rates of wages and have very similar effects for whites and blacks.

The explanatory power of the job change variables is indicated by the difference between the explanatory power of the regression which includes them and a regression which omits them. The partial R2 of these variables is .099 and .266 for whites and blacks, respectively, when "Trend in ln Wage" is the

---

[16] When equation 7 was estimated separately by race, a Chow test indicated different structure of coefficients ($F = 2.82$, $F_{.01,\ 25,\ 869} = 1.80$).

[17] The results obtained when the initial wage rate is omitted are listed in Table A3.1.

Table 3.3 (1 of 2)

MEANS AND STANDARD DEVIATIONS OF VARIABLES IN WAGE GROWTH MODEL, BY RACE

(For male household heads, age 23-38 in 1972.)

	Means		Standard Deviations	
	White	Black	White	Black
Education	13.27	11.45	2.64	2.47
Work Experience	11.10	11.18	4.71	5.12
Test Score	10.29	8.43	1.74	1.90
Achievement Motivation	9.68	9.11	2.55	2.81
Self-reported Efficacy	12.34	9.86	3.40	3.90
How Often Late?	.537	.918	1.259	1.423
How Often Absent?	.100	.372	.489	.760
ln City Size	4.90	5.66	1.81	1.71
Whether South	.281	.574	.450	.496
ln 1971 Wage Rate	1.389	1.175	.511	.393
Number of Promotions	.122	.067	.359	.260
Number of Quits	.420	.229	.744	.510
Number of Involuntary Job Changes	.219	.422	.566	.703
Change in Work Hours	.391	2.126	11.01	8.77
Number of Job related moves	2.64	.074	.617	.262
Six-year Unemployment	.027	.042	.061	.065
Remained Union	.192	.368	.394	.483
Joined Union	.056	.125	.230	.331
Left Union	.074	.084	.263	.279

Table 3.3 (2 of 2)

	Means		Standard Deviations	
	White	Black	White	Black
Remained self-employed	.059	.004	.236	.065
Became Self-employed	.116	.006	.320	.079
Left Self-employment	.027	.002	.164	.040
Remained in Durable Manufacturing	.127	.199	.333	.400
Entered Durable Manufacturing	.044	.085	.205	.279
Left Durable Manufacturing	.048	.067	.213	.251
Trend in ln Wage	.024	.016	.088	.075
ln 76 Wage - ln 71 Wage	.150	.105	.481	.414
ln 72 Wage - ln 71 Wage	.086	.036	.343	.322
Number of Observations	701	220		

Table 3.4 (Page 1 of 2)

EFFECTS OF CHANGES IN JOB CHARACTERISTICS ON WAGE GROWTH, BY RACE, CONTROLLING FOR BACKGROUND AND INITIAL WAGE

(For male household heads, age 23-38 in 1972.)

	Dependent Variable			
Independent Variable	Trend in ln wage		ln 1976 wage - ln 1971 wage	
	White	Black	White	Black
Number of promotions	.0131+ (.0082)	.0215 (.0158)	.0650 (.0424)	.1433+ (.0863)
Number of quits	-.0119** (.0044)	.021 * (.0093)	-.0612** (.0210)	.0847+ (.0597)
Number of involuntary job changes	-.0131* (.0060)	-.0152+ (.0080)	-.0795** (.0308)	-.0586 (.0436)
Change in work hours	-.0012** (.0003)	-.0007 (.0005)	-.0081** (.0014)	-.0048 (.0030)
Number of job-related moves	.0109* (.0053)	-.0460** (.0167)	.0688* (.0139)	-.1208 (.0913)
Six-year average unemployment	-.0268 (.0578)	-.1956* (.0828)	-.1947 (.2979)	-.9444* (.4526)
Remained union	.0178* (.0081)	.0326** (.0120)	.1313** (.0417)	.2136** (.0655)
Became union	.0336** (.0129)	.0488** (.0152)	.1486* (.0667)	.2755** (.0830)
Left union	-.0137 (.0114)	-.0260 (.0175)	-.0002 (.0589)	-.1004 (.0954)
Remained self-employed	-.0038 (.0130)	-.1017+ (.0603)	-.0217 (.0668)	.1379 (.3297)
Became self-employed	-.0352** (.0097)	-.0812+ (.0492)	-.1846** (.0498)	-.1864 (.2688)
Left self-employment	-.0289 (.0181)	-.0780 (.0968)	-.0809 (.0931)	.0256 (.5293)

Table 3.4 (Page 2 of 2)

Independent Variable	Trend in ln wage		ln 1976 wage - ln 1971 wage	
	White	Black	White	Black
Remained in Durable manufacturing	-.0080 (.0092)	-.0102 (.0127)	-.0270 (.0475)	.0235 (.0694)
Entered Durable manufacturing	.0267+ (.0143)	.0444** (.0156)	.1331+ (.0738)	.1549+ (.0876)
Left Durable manufacturing	.0001 (.0139)	-.0134 (.0182)	-.0128 (.0714)	.1404 (.0996)
R2 (adj.) (including background and initial wage rate)	.260	.427	.347	.442
Partial R2 (adj.)	.099	.266	.132	.182

Dependent Variable

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

dependent variable; and .132 and .182, respectively, when wage growth is measured by the difference between the logarithm of the 1976 and 1971 wage rate.[18]

The consistently most important job characteristic affecting wage growth appears to be union status. Whites and blacks who began the six-year period in non-union jobs but ended the period doing unionized work had yearly growth rates which were 3.4 percent and 5.0 percent higher, respectively, than workers who were doing non-union work at both points in time.[19] While part of this growth may have been due to a one-time increase in wages when joining the union (which may have been partially offset by more restrictive working conditions), the fact that workers who *remained* in union work did significantly better than non-union workers indicates that at least half of the higher growth rates were not counteracted by undesirable working conditions. The wage advantages of union work are particularly impressive for blacks. The final column of numbers in Table 3.4 indicates that the adjusted percentage increase in wage rates from the beginning to the end of the period was 31 percent higher for blacks who joined unions than for blacks who remained in non-union work and 24 percent higher for blacks in union work at the beginning and end of the period than for blacks in non-union work at both times.[20] A final bit of evidence on the wage benefits of

---

[18] The partial R2 is defined as

$$\frac{\bar{R}^2_{\text{with}} - \bar{R}^2_{\text{without}}}{1 - \bar{R}^2_{\text{without}}}$$

where "with" and "without" refer to the regressions which include and exclude the job change variables, respectively.

[19] These figures are derived from the first two columns of Table 3.4. Recall from Footnote 6 that the annual growth rate is related to the instantaneous growth rate, r, by the equation: $e^r - 1$. The coefficients on Table 3.4 give changes in the instantaneous growth rates associated with unit changes in the independent variables.

[20] When the dependent variable is ln 1976 Wage Rate - ln 1971 Wage Rate, the coefficients on the independent variables show the change in the dependent variable associated with a unit change in an independent variable, x_1 or

$$\frac{d\,(\ln 76 \text{ wage} - \ln 71 \text{ wage})}{dx_1} = \frac{d \ln \frac{76 \text{ wage}}{71 \text{ wage}}}{dx_1} = \frac{d \ln (1+y)}{dx_1},$$ when y is the percentage wage growth from 1971 to 1976. Now $\frac{d \ln (1+y)}{dx_1} = \frac{d \ln (1+y)}{dy} \cdot \frac{dy}{dx_1} = \frac{1}{(1+y)} \frac{dy}{dx_1}$,

union work shows up in the comparison of those who left union work and those who were doing non-union work at both points in time. Growth rates were generally lower for the former groups relative to the latter, although the coefficients measuring the differential were not significant at conventional levels.

Movement into and out of self-employment and work in durable manufacturing industries had more modest effects on wage growth. Changes from working for others to self-employment were associated with a significantly lower growth rate for wages. For both groups, changing jobs into durable manufacturing industries led to higher growth rates. The magnitude of the difference in these growth rates was similar for blacks and whites, although the smaller sample size for blacks and the smaller proportions making these changes resulted in larger standard errors.

Most of the remaining measures of change in job characteristics had expected effects on wage growth. Promotions generally increased growth rates, while involuntary job changes generally decreased them. Unemployment had a detrimental effect on the growth of hourly wages, but much more so for blacks than whites. The wages of blacks who experienced an additional month of unemployment per year grew at an annual rate nearly two percent lower than for otherwise similar blacks who did not experience that unemployment. It is important to note that the outcome variable here is the growth in the hourly wage rate which is calculated by dividing labor income by hours actually worked. These lower growth rates suggest that, for blacks, unemployment not only resulted in fewer work hours and lower incomes but also caused earnings per hour to be permanently less. Perhaps this resulted from the reduced opportunity for training caused by unemployment. However, this effect of unemployment persisted even when the total number of hours worked during the six-year period was added into the equation. Thus, it was not the reduced amount of experience per se that retarded wage growth. Instead, it was some unmeasured characteristics of those who experienced the unemployment or of the jobs they held that produced this result.

---

so the change in the wage growth (y) associated with a unit change in x_1 will depend upon the level of y. The average value of ln 1976 wage - ln 1971 wage for blacks is .105 (Table 3.3), so the average value of y is $e^{.105}-1=.1107$. To convert coefficients shown in Table 3.4 so that they can be in terms of the mean growth rates from 1971 to 1976, we multiply by 1.1107.

Quits had opposite effects on the wage growth of the two groups, increasing it for blacks and decreasing it for whites. Since quits are much less frequent for blacks than whites, it may be that blacks are more conservative in their job changes and quit jobs only if they are certain to get another at a higher wage. Whites may be more willing to gamble on this and, as a result, end up in jobs which on average pay somewhat less during the years immediately following the quits.[21] The opposite result holds for job-related moves. Such moves resulted in one percent higher annual growth rates for whites, but five percent lower growth rates for blacks.[22]

Initial Wage Rate

There is a strong negative correlation between the natural logarithm of the initial wage rate and the two measures of subsequent wage change ($r = -.383$ and $-.249$ for whites and blacks, respectively, with the trend in ln wage measure of change and $r = -.441$ and $-.358$, respectively, with the ln 1976 wage - ln 1971 wage measure of change), but it is not clear whether this negative relationship is a substantive finding or merely due to measurement error. The inclusion of the initial wage rate does have a substantial impact on the estimated effects of other variables in the model, especially the background variables, and so it warrants further investigation.[23]

---

[21] The literature on the relation between quits and wage change gives conflicting results. Some studies using the National Longitudinal Study data (Bartel and Borjas 1977; Mellow 1977) find positive and significant effect for quits, while Black's (1978) analysis of the Panel Study data showed detrimental effects on the wage growths, especially for those who did not search before quitting. In private correspondence, Black indicated the detrimental effects of quits were more negative for blacks than whites.

[22] There is little consensus on the effects of geographic mobility on earnings (see Greenwood 1975, pp. 400-404). There is some indication that the payoff is greater for blacks than whites, but that this payoff doesn't show up until at least five years after the move.

[23] Inclusion of the initial wage rate in the right-hand side might also alter the interpretation of the coefficients on other independent variables. Suppose that the complete model is:

$$(8)\quad \text{Trend in } \underline{\ln} \text{ wage}_i = \alpha_1 + \beta_1 \text{Ed}_i + \beta_2 \ln 1971 \text{ wage}_i$$

As shown in Footnote 5, trend in ln wage is merely the weighted sum of the individual wage rates, so (8) can be rewritten as:

The total effect of the initial wage on wage growth can be decomposed into the sum of a direct effect which is independent of the background and job change variables and indirect effects which operate through the job change measures. These indirect effects are the product of the coefficients of the initial wage variable in Equation 6 (in which the measures of job change are regressed on the initial wage and on the background variables) and the coefficients on the job change variables in Equation 7. These total, direct and indirect effects are shown in Table 3.5. Underscoring indicates indirect effects which are the product of two coefficients that are statistically significant at the 10 percent level or below.

The size of the indirect effects can be taken as one indication of the substantive role played by the initial wage rate in the model. Suppose wage growth is less for initially high-wage workers because their high wages inhibit beneficial geographic mobility to urban areas. This should show up as a strong negative indirect effect operating through the measure of change in city size. If low wages indicate that training is taking place, other things being equal, then the initial wage rate should have indirect effects through the investment variables. The results shown in Table 3.5, indicate, however, that the direct effect of the initial wage on wage growth is much larger than any of the indirect effects. For whites, the largest indirect effect involves the change in work hours variable: whites with initially higher wages are more likely to increase work hours, and these increases in turn lower wage growth. The initially high-wage blacks are more likely to begin and remain in union work, which in turn leads to higher wage growth. The latter group is also significantly less likely to experience involuntary job changes or to quit. Only this last result supports a substantive interpretation for the role of the initial wage rate. In general, then, the negative correlation between initial wage and wage growth probably reflects regression to the mean or random measurement errors in the initial wage

---

(9) $\frac{-2.5}{17.5}$ ln 1971 wage rate - $\frac{1.5}{17.5}$ ln 1972 wage rate - . . . + $\frac{2.5}{17.5}$ ln 1976 wage rate = $\alpha_1 + \beta_1 ED_i + \beta_2$ ln 1971 wage rate; subtracting β_2 ln 1971 wage rate from both sides,

(10) $\left(\frac{-2.5}{17.5} + \beta_2\right)$ ln 1971 wage rate - . . . + $\frac{2.5}{17.5}$ ln wage rate = $\alpha_1 + \beta_1 Ed_i$.

The interpretation of β_1 as the effect of a unit change in education on wage growth no longer strictly applies and the appropriateness of that interpretation will depend upon the size of β_2. In fact, $\beta_2 \simeq -.08$, so that the weight attached to ln 1971 wage rate in the trend in ln wage rate measure is -.063 rather than -.143. The effects of this on the interpretation of the coefficients is likely to be quite small.

Table 3.5 (Page 1 of 2)

ACCOUNTING FOR THE EFFECTS OF ln 1971 WAGE RATE ON WAGE GROWTH

(For all male household heads, age 23-38 in 1972.)

Dependent Variable: Trend in ln Wage Rate

	Whites			Blacks		
Total Effect			-.0787** (.0068)			-.0648** (.0136)
Direct Effect			-.0797** (.0069)			-.0819** (.0147)
Indirect Effect Via:	Effect of ln 1971 Wage Rate on X	Effect of X on Wage Growth	Indirect Effect	Effect of ln 1971 Wage Rate on X	Effect of X on Wage Growth	Indirect Effect
Number of promotions	.0289	.0131	.0004	.0298	.0215	.0006
Number of quits	-.1432*	-.0119**	.0017	-.4188**	.0210*	-.0088
Number of involuntary job changes	-.1182*	-.0131*	.0015	-.3213*	-.0152+	.0049
Change in Work Hours	3.0714**	-.0012**	-.0037	3.5837*	-.0007	-.0025
Number of Job-Related Moves	-.0731	.0109*	.0008	.0636	-.0460**	-.0029
Six-Year Unemployment	-.0075	-.0268	.0002	-.0207	-.1956*	.0040
Remained Union	.1293**	.0178*	.0023	.5796**	.0326**	.0189
Became Union	-.0266	.0336**	-.0009	.0042	.0488**	.0002
Left Union	-.0018	-.0137	.0000	.0121	-.0269	-.0003

Table 3.5 (Page 2 of 2)

	Whites			Blacks		
Total Effect			-.0787** (.0068)			-.0648** (.0136)
Direct Effect			-.0797** (.0069)			-.0819** (.0147)
Indirect Effect Via:	Effect of ln 1971 Wage Rate on X	Effect of X on Wage Growth	Indirect Effect	Effect of ln 1971 Wage Rate on X	Effect of X on Wage Growth	Indirect Effect
Remained Self-Employed	-.1149**	-.0038	.0004	-.0084	-.1017+	.0009
Became Self-Employed	-.0051	-.0352**	.0002	-.0097	-.0812+	.0008
Left Self-Employment	-.0401**	-.0289	.0012	.0004	-.0780	.0000
Remained in Durable Manufacturing	.1023**	-.0080	-.0008	.0205	-.0102	-.0002
Entered Durable Manufacturing	-.0274	.0267+	-.0007	-.0505	.0444**	.0022
Left Durable Manufacturing	-.0065	.0001	.0000	.0387	-.0134	-.0005

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

Underscore indicates effects which are the product of two coefficients that are significant at .10 level or below.

estimate.

Background Variables

The background variables included in the model fall into four groups: human capital variables (education, work experience, and test score); attitudinal variables (achievement motivation and efficacy); work habits (How often late? and How often absent?); and two demographic variables (ln city size and whether South). Since the inclusion of the initial wage rate changes the estimated effects of these background variables on wage growth, Tables 3.6 and 3.7 show coefficients from regressions which exclude and include the natural logarithm of the initial rate. The final two columns of numbers on these tables show the effects of the background variables on one-year change in earnings. This comparison is of some interest because previous work has shown that the effects of some variables change considerably as the time period is lengthened.[24]

Education has a positive effect on wage growth for both whites and blacks which becomes statistically significant when the initial wage is controlled for. The size of these significant coefficients suggests that an additional year of education adds 0.4 percent to the annual earnings growth rate--an amount which is substantially less than the one-year growth rate equation indicates. The usual interpretation given to the relationship between education and wage growth is that education and training are complements--a result which was given support in the Panel Study data when a direct measure of training was analyzed.[25] The indirect effects of education operating through the job change variables are discussed below.

Neither work experience nor the test score measures had consistently significant effects on wage growth. Experience did have a negative and significant effect for whites when the effect of initial wage was not taken into account. This is consistent with the typical cross-sectional finding that for whites earnings increase at a decreasing rate with experience. The test score measure had a weak positive effect on the wage growth rates for blacks.

The attitudinal variables had generally significant effects on wage growth, but not always in the expected direction. Blacks who began the period with high levels of achievement motivation did significantly better than otherwise similar

---

[24] Duncan and Morgan (forthcoming) found that the effects of efficacy on earnings change and become stronger as the time period is lengthened.

[25] See Duncan and Hoffman (1978).

Table 3.6

EFFECTS OF BACKGROUND VARIABLES ON WAGE GROWTH, WITH AND WITHOUT CONTROLLING FOR ln 1971 WAGE RATE

(For white male household heads, age 23-38 in 1972.)

Independent Variable	Dependent Variable					
	Trend in ln Wage Rate		ln 1976 Wage Rate— ln 1971 Wage Rate		ln 1972 Wage Rate— ln 1971 Wage Rate	
	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate Without	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate
Education	.0016 (.0015)	.0040** (.0014)	.0101 (.0080)	.0254** (.0071)	.0076 (.0058)	.0198** (.0050)
Work Experience in 1972	-.0025** (.0007)	-.0003 (.0007)	-.0150** (.0040)	-.0006 (.0036)	-.0054+ (.0029)	.0061* (.0025)
Test Score	-.0004 (.0021)	.0008 (.0019)	-.0066 (.0133)	.0013 (.0100)	.0059 (.0081)	.0122+ (.0069)
Achievement Motivation	.0003 (.0014)	.0010 (.0012)	.0060 (.0074)	.0102 (.0065)	.0025 (.0054)	.0058 (.0046)
Self-Reported Efficacy	.0012 (.0010)	.0023* (.0009)	.0060 (.0056)	.0131** (.0049)	.0013 (.0040)	.0069* (.0034)
How Often Late?	-.0047+ (.0027)	-.0033 (.0025)	-.0255+ (.0147)	-.0170 (.0129)	-.0062 (.0106)	.0005 (.0090)
How Often Absent?	-.0051 (.0068)	-.0038 (.0062)	-.0561 (.0372)	-.0480 (.0327)	-.0628* (.0268)	-.0563* (.0228)
ln City Size	-.0029 (.0019)	.0041* (.0018)	-.0130 (.0104)	.0323** (.0097)	.0002 (.0075)	.0363** (.0068)
Whether South	.0040 (.0076)	-.0018 (.0070)	.0169 (.0451)	-.0209 (.0366)	-.0248 (.0299)	-.0549* (.0255)
R^2 (adj.)	.022	.179	.029	.247	.012	.285

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

Table 3.7

EFFECTS OF BACKGROUND VARIABLES ON WAGE GROWTH, WITH AND WITHOUT CONTROLLING FOR ln 1971 WAGE RATE

(For black male household heads, age 23-38 in 1972.)

Independent Variable	Dependent Variable					
	Trend in ln Wage Rate		ln 1976 Wage Rate- ln 1971 Wage Rate		ln 1972 Wage Rate- ln 1971 Wage Rate	
	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate Without	Without Controlling for ln 1971 Wage Rate	Controlling for ln 1971 Wage Rate
Education	.0018 (.0025)	.0040+ (.0024)	.0268+ (.0138)	.0445** (.0126)	.0421** (.0110)	.0579** (.0097)
Work Experience in 1972	-.0001 (.0011)	.0007 (.0011)	-.0034 (.0061)	.0026 (.0056)	-.0023 (.0049)	.0031 (.0043)
Test Score	.0034 (.0028)	.0045+ (.0027)	-.0050 (.0153)	.0043 (.0138)	-.0254* (.0123)	-.0171 (.0107)
Achievement Motivation	.0046* (.0019)	.0045* (.0018)	.0327** (.0107)	.0316** (.0095)	.0116 (.0085)	.0106 (.0074)
Self-Reported Efficacy	-.0037** (.0013)	-.0026* (.0012)	-.0149* (.0070)	-.0064 (.0197)	-.0120* (.0056)	-.0037 (.0050)
How Often Late?	-.0007 (.0040)	.0003 (.0038)	-.0140 (.0220)	-.0064 (.0197)	-.0356* (.0176)	-.0288+ (.0152)
How Often Absent?	-.0179* (.0077)	-.0238** (.0074)	-.0391 (.0422)	-.0859* (.0383)	.0553+ (.0338)	.0135 (.0297)
ln City Size	.0062+ (.0035)	.0094** (.0034)	.0154 (.0193)	.0411* (.0177)	-.0212 (.0155)	.0017 (.0137)
Whether South	.0388** (.0119)	.0261* (.0117)	.1946** (.0658)	.0932 (.0605)	.0439 (.0526)	-.0466 (.0468)
R^2 (adj.)	.139	.219	.148	.317	.102	.326

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

131

blacks with lower levels of motivation--a result which became significant only after the time period was extended from one to six years. Efficacy worked in the expected direction for whites when the initial wage was added in, but it showed a negative and significant effect on the wage growth of blacks. This latter result runs contrary to what Andrisani found with NLS data on younger and older men, and it also differs from the results of an analysis done by Duncan and Morgan (forthcoming) using the Panel Study data but with a different sample and different model of wage change. The intercorrelation between the two attitudinal measures did not cause this result; excluding the achievement motivation variable had little effect on the coefficient of the efficacy variable for each subgroup.

The measures of work habits had the expected negative effects on the six-year wage growth variables, although most of the coefficients were not statistically significant at conventional levels. The self-reports of being late for work hurt whites more than blacks, while the reverse was true for the reports of absence when not sick.

Growth rates were generally higher for whites and blacks who began in bigger cities--especially when the effects of the initial wage were controlled for. The final demographic variable--whether South--has highly significant positive effects on the growth of wages for blacks but not whites. The results suggest that the black-white earnings gap is being reduced in the South, which is exactly what Smith and Welch (1978) found in their analysis of CPS data.

The intervening job change variables were included in the model to help account for the relationships between the background variables and wage growth. Tables 3.8 and 3.9 show the total and direct effects of the background variables plus the indirect effects where both of the coefficients which were multiplied to calculate the indirect effect were statistically significant at the 10 percent level or below. Indirect effects involving job change variables with insignificant effects on wage growth are not shown on the table.

In general, these tables show very few of the indirect effects hypothesized in either human capital or dual labor market models. The largest indirect effects operate through the initial wage rate, and very few of the other indirect effects are large enough to be worthy of note. If the education-wage growth relationship was caused by increased human capital investment, then we would expect that education would operate through such investment variables as promotions, quits, and geographic mobility. Of these three, however, only the latter is supported, and that is for whites only. Higher levels of education are associated with fewer involuntary job changes for both racial subgroups, but the

Table 3.8

ACCOUNTING FOR THE EFFECTS OF BACKGROUND VARIABLES ON TREND IN ln WAGE
(For white male household heads, age 23-38 in 1972.)

Background Variable	Total Effect (Without Controlling for Wage Rate or Job Change Variables)	Direct Effect (Controlling for ln 1971 Wage Rate and Job Change Variables)	Indirect Effect Via:								
			ln 1971 Wage (-)	Number of Quits (-)	Number of Involuntary Job Changes (-)	Change in Work Hours (-)	Number of Job-Related Moves (+)	Remained Union (+)	Became Union (+)	Became Self-Employed (-)	Entered Durable Manufacturing (+)
Education	.0016	.0039**	-.0024**	-	.0003*	-	.0004**	-.0006**	-	-	-.0002+
Work Experience in 1972	-.0025**	-.0005	-.0023**	.0002**	.0001*	.0003*	-	-	-.0002**	-	-
Test Score	-.0004	.0015	-	-	-	-.0006*	-	-.0003+	-	-	-
Achievement Motivation	.0003	.0013	-	-	-	-	-	-	-	-	-
Efficacy	.0012	.0022*	-.0011**	-	.0002+	-	-	-	-	-.0003*	-
How Often Late?	-.0047	-.0016	-	-	-	-	-	-	-	-.0013**	-
How Often Absent?	-.0051	-.0003	-	-.0013+	-	-	-	-	-	-	-
ln City Size	-.0029	.0044	-.0071**	-	-	.0006*	-	-	-	-	-
Whether South in 1971	.0040	-.0001	.0059+	-.0018*	-	.0023*	-	-.0019*	-.0016*	-	-

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

Note: Significance tests for indirect effects apply to coefficients from regressions of intervening variables on background variables and ln 1971 wage rate. A "-" indicates that the coefficient was not significantly different from zero at .10 level.

Table 3.9

ACCOUNTING FOR THE EFFECTS OF BACKGROUND VARIABLES ON TREND IN ln WAGE

(For black male household heads, age 23-38 in 1972.)

	Total Effect	Direct Effect	Indirect Effects via:							
Background Variable	(Without Controlling for Initial Wage Rate or Job Change Variables	(Controlling for Initial Wage Rate and Job Change Variables)	ln 1971 Wage Rate (-)	Number of Quits (+)	Number of Involuntary Job Changes (-)	Number of Job-Related Moves (-)	Six-Year Average Unemployment (-)	Remained Union (+)	Became Union (+)	Entered Durable Manufacturing (+)
Education	.0018	.0002	-.0028**	-	.0011*	-	.0013**	-	-	.0013**
Work Experience in 1972	-.0001	.0011	-.0010*	-.0005**	-	-	-	-	-	.0005*
Test Score	.0034	.0051*	-	-	-.0012*	-	-	-.0019**	.0018**	.0010*
Achievement Motivation	.0046*	.0055**	-	-	-.0010**	.0007+	-	-.0009*	-	-
Efficacy	-.0037**	-.0018	-.0015**	.0007**	-	-.0003*	-	-	-.0012**	-
How Often Late?	-.0007	.0083*	-	-	-	-	-.0018*	-.0013+	-.0018*	-
How Often Absent?	-.0179*	-.0364**	.0075*	-	.0033*	-	.0029*	.0046**	-	-
ln City Size	.0062+	.0039	-.0041**	-	.0018*	-.0017**	-	-	.0031**	-
Whether South	.0388**	.0095	.0161**	-	.0057*	-	-	-	.0144**	-

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

Note: Significance tests for indirect effects apply to coefficients from regressions of intervening variables on background variables and ln 1971 wage rate. A "-" indicates that the coefficient was not significantly different from zero at .10 level.

.37

increase in annual wage growth associated with this indirect effect is only .03 percent per year of education for whites and .11 percent per year of education for blacks. For blacks, the largest indirect effects of education operate through unemployment (the higher the education, the lower the unemployment) and job changes into a durable manufacturing industry, but the size of these indirect effects is quite small.

The largest indirect effect which shows up on these tables is the "whether South" variable for blacks. Nearly half of the higher growth rates for blacks in the South appears to be due to their increased rates of unionization. The remaining indirect effects are much smaller and often operate in unexpected directions.

ACCOUNTING FOR RACIAL DIFFERENCES IN WAGE GROWTH

The average annual earnings growth rate of blacks was only a little lower than that of whites--.73 percent--and that difference was not statistically significant. But this overall difference is the sum of a number of potentially offsetting effects. Blacks have less education than whites, for example and, since education has been found to have a positive effect on growth rates, the educational difference adds to the disparity in growth rates. On the other hand, blacks in the sample were more likely to remain in or join unions; since union members did better than non-union workers, this union differential made the racial differences in earnings growth rates smaller than it would otherwise have been. In this section we investigate the extent to which racial differences in earnings growth rates are associated with racial differences in amounts of human capital, in attitudes, in work habits, and in changes in job characteristics. We begin with the contribution of the job change variables, since they are most amenable to change. Next, the contribution of differences in the background variables are assessed.

Changes in Job Characteristics

Racial differences in job characteristics are calculated by regressing each measure of change in job characteristics on the background variables, ln 1971 wage rate and a dichotomous "whether black" measure of race. The coefficients obtained for the race variable from these regressions are shown in the first column of numbers of Table 3.10. These differences can be valued in three ways: first, from coefficients on job change variables from the wage growth model of blacks (shown in Table 3.3); second, from coefficients from the wage growth model

Table 3.10 (Page 1 of 2)

CHANGES IN WAGE GROWTH ASSOCIATED WITH BLACK-WHITE DIFFERENCES IN CHANGES IN JOB CHARACTERISTICS

(For male household heads, age 23-38 in 1972.)

Dependent Variable = Trend in ln Wage Rate

Independent Variable (X)	Effect of "Whether Black" on X	Changes in Wage Growth when Black-White Differences are valued by: Coefficients from Black Wage Growth Model	Coefficients from White Wage Growth Model	Coefficients from Pooled Model
Number of promotions	-.0311	-.0007	-.0004	-.0004
Number of quits	-.3263**	-.0069	.0039	.0037
Number of involuntary job changes	.1481+	-.0023	-.0019	-.0020
Change in work hours	3.4919*	-.0024	-.0042	-.0038
Number of job-related moves	-.1337+	.0062	-.0015	.0013
Six-year unemployment	.0006	.0001	.0000	-.0000
Remained union	.1595**	.0052	.0028	.0029
Became union	.0578+	.0028	.0019	.0022
Left union	-.0226	.0006	.0003	.0003

Table 3.10 (Page 2 of 2)

Independent Variable (X)	Effect of "Whether Black" on X	Changes in Wage Growth when Black-White Differences are valued by: Coefficients from Black Wage Growth Model	Coefficients from White Wage Growth Model	Coefficients from Pooled Model
Remained self-employed	-.0487	.0050	.0002	.0002
Became self-employed	-.0992*	.0081	.0035	.0035
Left self-employment	-.0421*	.0033	.0012	.0012
Remained in durable manufacturing	.0731	-.0007	-.0006	-.0006
Entered durable manufacturing	.0336	.0015	.0009	.0010
Left durable manufacturing	.0180	-.0002	.0000	.0000

+Significantly different from zero at the .10 level.
*Significantly different from zero at the .05 level.
**Significantly different from zero at the .01 level.
Coefficients are obtained from regression of trend in ln wage on the job change variables, ln 1971 wage rate, and background variable. Underscoring indicates estimated changes in wage growth which are the product of two coefficients that are significant at the .10 level or below.

of whites (also shown in Table 3.3); and third, from a model in which the observations on both blacks and whites are pooled together. The calculations based on the coefficients for blacks are most appropriate to assess the impact on wage growth of giving blacks the white mean on the various independent variables. Since whites constitute the vast majority of male labor force participants, the "pooled" coefficients are similar to the coefficients for whites.

The product of the racial difference in job change variables and these three sets of coefficients are shown in the final three columns of Table 3.10. Numbers that are the product of two coefficients which are significant at the ten percent level or below are underscored. As an example, the third row of numbers shows that blacks have a regression-adjusted average number of involuntary job changes which is .1481 higher than the adjusted white mean--a statistically significant difference. When this difference is valued by the impact of involuntary job changes on the earnings growth rate for blacks, it is found to contribute .23 percent to the racial difference in the annual growth rate of earnings. In other words, if blacks had the same (smaller) number of involuntary job changes as whites, and if involuntary job changes caused the estimated wage growth effects shown in Table 3.4, blacks' earnings growth rates would increase by .23 percent annually relative to whites. Since the wage growth penalty for an involuntary job change is similar for whites and blacks, their estimated contribution to racial differences in growth rates changes little when they are valued with white coefficients, -.19 percent versus -.23 percent. The calculation using the pooled coefficient is between these two numbers.

Several of the racial differences in the job change measures make modest contributions to differences in earnings growth rates. The fact that blacks were more likely to remain in or join unions made the racial difference in annual growth rates about one-half to three-quarters of a percent smaller than it otherwise would have been, depending on which coefficients are used to value the union variables. The lower incidence of blacks becoming self-employed, coupled with the detrimental effect of self-employment on wage growth, also prevented the racial differences in wage growth from being larger.

The effects of quits and job-related moves change dramatically when valued by the different coefficients. Quits were found to have a beneficial effect on the wage growth of blacks and an unfavorable effect for whites, while the opposite was true for the job-related moves.

Although unemployment was found to have a detrimental effect on the growth rates of blacks, it makes no contribution to racial differences in growth rates.

This is due to the very small adjusted differences in unemployment rates between blacks and whites. The unadjusted difference was substantial (shown in Table 3.3) but adjustments for the effects of background variables (education, in particular) reduce the difference substantially.

Background

The contribution of racial differences in background variables to differences in earnings growth is shown in Table 3.11. In this table, background differences are valued with coefficients from regressions of wage growth on the background variables and ln 1971 wage rate. Since these coefficients differed in size and even direction between the black and white models, the contribution of many of these background variables to racial differences in growth rates is less certain than for the job-change variables.

Least ambiguous is the finding that black-white differences in the quantity of education played a significant role in producing different average growth rates. The nearly two-year difference in educational attainment, coupled with the significant effects of education on wage growth, accounted for about three-quarters of a percent of the racial differences in annual growth rates. It is unclear how education operates to cause wages to grow faster since there was little evidence that education "worked" by increasing one's chances of promotion or beneficial job changes.

Racial differences in the test score measure, perhaps caused in part by differences in the quality and quantity of education, also contributed to differences in growth rates--but only when valued by the black coefficients.

The contribution of racial differences in the attitudinal measures also depended upon which coefficients one used to value them. Equalizing average scores on the achievement motivation index would have caused the earnings growth rates to converge by .26 percent if the black coefficient was used to value the contribution of motivation on wage growth. Equalizing efficacy scores had opposite effects on racial differences in wage growth in the two models, apparently causing them to converge if the white coefficient was used and causing them to diverge with the black coefficients. The remaining variables were also quite sensitive to which coefficients were used. The larger proportion of blacks in the South apparently caused racial differences to be smaller than they otherwise would have been, since growth rates for them have been much higher than average. Of the work habit variables, only the measure of absence made a contribution to explaining race differences in wage growth, and that happened

Table 3.11

CHANGES IN WAGE GROWTH ASSOCIATED WITH BLACK-WHITE DIFFERENCES IN BACKGROUND VARIABLES

(For male household heads, age 23-38 in 1972.)

Dependent Variable = Trend in ln Wage Rate

Independent Variable(X)	Effect of "Whether Black" on X	Changes in Wage Growth when Black-White Differences are valued by:		
		Coefficients from Black Wage Growth Model	Coefficients from White Wage Growth Model	Coefficients from Pooled Model
Education	-1.8209**	-.0073	-.0073	-.0075
Work Experience	.0724	.0000	-.0000	-.0000
Test Score	-1.8638**	.0084	-.0015	-.0017
Achievement Motivation	-.5736+	-.0026	-.0006	-.0008
Efficacy	-2.4728**	.0064	-.0057	-.0047
How Often Late?	.3812*	.0001	-.0013	-.0012
How Often Absent?	.2721**	-.0064	-.0010	-.0017
ln City Size	.7523**	.0071	.0031	.0033
Whether South	.2929**	.0076	-.0005	.0004

+Significantly different from zero at the .10 level.
*Significantly different from zero at the .05 level.
**Significantly different from zero at the .01 level.

Coefficients are obtained from regression of trend in ln wage on background variables and ln 1971 wage rate. Underscoring indicates estimated changes in wage growth which are the product of two coefficients that are significant at the .10 level or below.

only when the black coefficients were used.

SUMMARY

This chapter has estimated a model of wage growth for black and white workers in their 20's and 30's which included characteristics of the workers and jobs at the beginning of the time period (1971) as well as measures of changes that occurred during the time that the wage growth was monitored (through 1976). The model itself is recursive and allows for the effects of the initial characteristics to operate through the measures of change.

One of the most important findings is simply the tremendous dispersion in the rates of growth in the earning of individual workers; the variation within the groups of black and white workers was much larger than the variation between the two groups.

The model of wage growth was able to account for nearly half of the variation in the earnings growth rates of blacks and about one-quarter of the variance for whites. The changes in job characteristics were much more important than the initial measures, and many of these changes had similar effects for blacks and whites. Movements into and out of union work were consistently important for both groups. The annual earnings growth rates for blacks and whites who changed from non-union to union work were higher by more than five percent and three percent, respectively, than for workers who remained in non-union work. Those who began the period in unionized jobs and remained in them also did better than non-union workers. Among the other change variables, becoming self-employed generally lowered wage growth rates, while getting a job in a durable manufacturing industry generally raised them. Promotions also helped, while involuntary job changes and unemployment hurt, especially among blacks.

The job change variables also helped to account for the effects of the background variables on wage growth. Thus if education, cognitive skills, attitudes, or work habits were found to have significant effects on wage growth, the model allocated these effects among the change measures. In fact, very few of these indirect effects were quantitively important. The only noteworthy exception was for blacks: more than one-third of the higher average growth rates of blacks who were living in the South at the beginning of the period was accounted for by the increased unionization of blacks in that region.

Other background variables, especially education, had significant effects on wage growth, but these effects did not appear to operate through the voluntary or involuntary job change measures included in the model. Similarly, there was little evidence to support the hypothesis that the work habits of blacks reduce this growth in wages by confining them to jobs in the secondary sector of the economy.

Attitudinal variables were included in the model and were found to have mixed effects on earnings. The index of achievement motivation had a positive and statistically significant effect on the earnings growth rates of blacks. The efficacy measure had significant effects for both groups, but for blacks these were in the negative direction.

Although black-white differences in average income growth rates were small, this was seen to result from several offsetting forces. The growth rates would have been lower for blacks relative to whites if blacks had less frequently joined unions or remained in unionized jobs. And if blacks had experienced as few involuntary job changes as whites or had begun the period with as much education, their growth rates would have been higher relative to whites. Other variables in the model may also play a role, although their estimated importance depended critically on whether they were valued by coefficients from the black or white wage growth model.

This initial look at the correlates of wage change has met with mixed success. We have shown that a number of characteristics of workers and their labor market experiences do indeed account for a substantial fraction of the variance in wage growth rates. Furthermore, the relative importance of most of these characteristics is quite similar for blacks and whites and changes little with different definitions of wage growth. We did not, however, find any of the indirect effects predicted by the human capital and segmented labor market schools of thought. Persons with more education generally had higher growth rates, but this was not because they engaged in more of such voluntary investment activity as quits, promotions, or job-related moves. Those with bad work habits generally had lower wage growth rates, but this was not due to a reduced chance of getting into primary sector jobs. These failures suggest that neither model provides a comprehensive explanation of wage growth.

References

Andrisani, Paul J. "Internal-External Attitudes, Personal Initiative, and the Labor Market Experience of Black and White Men." Journal of Human Resources 12 (Summer 1971), pp. 308-328.

Bartel, A. P., and Borjas, G. J. "Middle-Age Job Mobility: Its Determinants and Consequences," National Bureau of Economic Research Working Paper, No. 161, January 1977.

Black, Matthew. "Pecuniary Implications of On-the-Job Search and Quit Activity," Mathematica Policy Research, 1978. Mimeograph.

Cain, Glen G. "The Challenges of Segmented Labor Market Theories to Orthodox Theory: A Survey." The Journal of Economic Literature 14 (December 1976): 1214-57.

Dickinson, Katherine. "Wage Rates of Heads and Wives." In Five Thousand American Families--Patterns of Economic Progress, Vol. I, by James N. Morgan et al. Ann Arbor: Institute for Social Research, 1974.

Duncan, Greg J., and Hoffman, Saul D. "Training and Earnings." In Five Thousand American Families--Patterns of Economic Progress, Vol. VI, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1978.

Duncan, Greg J., and Morgan, James N. "Sense of Efficacy and Changes in Economic Status--A Comment on Andrisani." Journal of Human Resources, forthcoming.

Duncan, Greg J., and Stafford, Frank P. "Do Union Members Receive Compensating Wage Differentials?" Institute for Social Research, 1978. Mimeograph.

Greenwood, Michael J. "Research on Internal Migration in the United States: A Survey." The Journal of Economic Literature, 13 (June 1975): pp. 397-434.

Hanushek, Eric A., and Quigley, John M. "More Exacting Tests of the OJT Investment Model." Yale University, 1978. Mimeograph.

Hoffman, Saul D. "Patterns of Change in Individual Earnings." In Five Thousand American Families--Patterns of Economic Progress, Vol. V, edited by Greg J. Duncan and James M. Morgan. Ann Arbor: Institute for Social Research, 1977.

Lazear, Edward. "Age, Experience, and Wage Growth." American Economic Review, 66 (September 1976): 548-558.

Mellow, W. "Turnover in the Youth Labor Market." The American Statistical Association Proceedings of the Business and Economics Statistics Section, 1977, pp. 632-637.

Schiller, Bradley R. "Relative Earnings Mobility in the United States." American Economic Review, 67 (December 1977), pp. 926-941.

Smith, James P., and Welch, Finis. Race Differences in Earnings: A Survey and New Evidence. Rand report R-2295-NSF, Rand Corporation, March 1978.

Table A3.1 (Page 1 of 2)

EFFECTS OF CHANGES IN JOB CHARACTERISTICS ON WAGE GROWTH (without controlling for ln 1971 wage rate)

Independent Variable	Dependent Variable			
	Trend in ln wage		ln 1976 wage - ln 1971 wage	
	White	Black	White	Black
Number of promotions	.0114 (.0090)	.0179 (.0169)	.0537 (.0484)	.1150 (.0989)
Number of quits	-.0091+ (.0048)	.0339** (.0097)	-.0434+ (.0261)	.1851** (.0564)
Number of involuntary job changes	-.0086 (.0065)	-.0112 (.0085)	-.0540 (.0351)	-.0283 (.0498)
Change in normal work hours	-.0016** (.0003)	-.0016** (.0006)	-.0107** (.0016)	-.0115** (.0033)
Number of job-related moves	.0136* (.0057)	-.0567** (.0178)	.0865** (.0310)	-.2042* (.1041)
Six-year average unemployment	-.0302 (.0632)	-.2022* (.0890)	-.2163 (.3406)	-.9954+ (.5194)
Remained union	.0083 (.0088)	.0006 (.0113)	.0700 (.0474)	-.0351 (.0659)
Became union	.0382** (.0141)	.0320* (.0160)	.1789* (.0762)	.1452 (.0933)
Left union	-.0171 (.0125)	-.0515** (.0181)	-.1125+ (.0674)	-.2914** (.1060)
Remained self-employed	.0297* (.0138)	-.1004 (.0648)	.1938** (.0745)	.1485 (.3783)
Became self-employed	-.0314** (.0106)	-.0680 (.0528)	-.1603** (.0569)	-.0842 (.3081)
Left self-employment	-.0081 (.0197)	-.0890 (.1040)	.0533 (.1060)	-.0601 (.6073)

Table A3.1 (Page 2 of 2)

Independent Variable	Dependent Variable			
	Trend in ln wage		ln 1976 wage - ln 1971 wage	
	White	Black	White	Black
Remained in durable manufacturing	-.0157	.0011	-.0767	.0946
	(.0100)	(.0135)	(.0541)	(.0790)
Entered durable manufacturing	.0369*	.0450**	.1988*	.1597
	(.0151)	(.0172)	(.0842)	(.1005)
Left durable manufacturing	.0013	-.0307	-.0050	.0066
	(.0151)	(.0193)	(.0816)	(.1127)
Total R2 (adj.) (including background)	.115	.338	.146	.265
Partial R2 (adj.)	.095	.232	.121	.138

+Significantly different from zero at .10 level.

*Significantly different from zero at .05 level.

**Significantly different from zero at .01 level.

Chapter 4

PARTICIPATION IN THE FOOD STAMP PROGRAM AMONG THE POVERTY POPULATION, 1976

Richard D. Coe

INTRODUCTION

The food stamp program has evolved into the major publicly financed program to provide families with nutritionally adequate diets. In fiscal year 1977, over eight billion dollars worth of food stamps were issued. Of this total, five billion dollars represented an income transfer to participating families.[1] During September 1977, over 16 million individuals benefitted from the use of food stamps. Forty-eight percent of these participants were in households receiving public assistance income.

Despite these large numbers, studies of the use of food stamps place the participation rate among eligible households at less than 50 percent.[2] The reasons for this low participation rate are not clearly understood. Various explanations have been advanced: eligible families don't know about the potential benefits from the program; people aren't willing to endure the stigma attached to receiving welfare; benefit levels are too low to make it worthwhile for a family to expend the time and energy needed to obtain the stamps; eligible families do not have the necessary transportation to enable them to acquire their food stamps; and so forth. Recent legislation has eliminated the purchase requirement,[3] one obstacle which was commonly believed to inhibit participation--the purchase prices of the stamps being too high for cash-short households to afford.

This chapter tests the relative importance of these various factors in the decisions among poverty households about whether to participate in the food stamp program. This examination builds on previous analyses of food stamp participation, presented in this series of volumes and elsewhere, but utilizes information acquired from new questions asked in the Panel Study's tenth wave of interviewing to gain more precise insights into the reasons for nonparticipation among poverty households. These new questions are discussed below and following sections present the descriptive and analytical results.

---

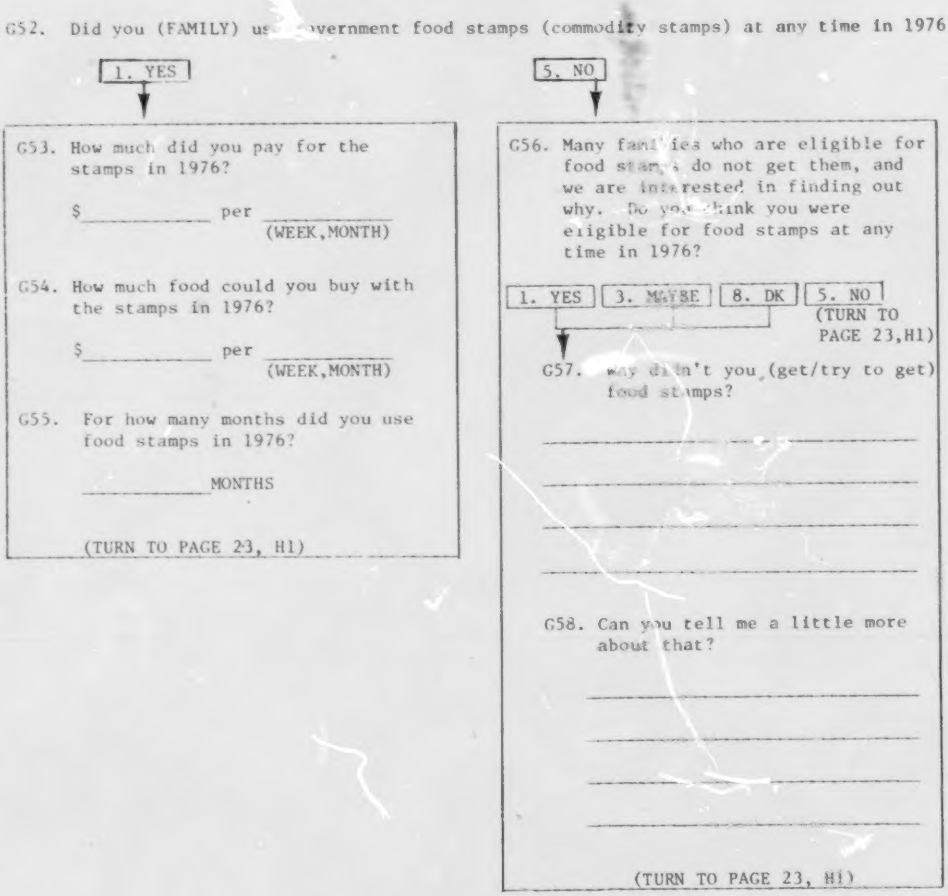
[1] U. S. Department of Agriculture (1977).

[2] See, for example, Bichel and MacDonald (1975); Coe (1976); and U. S. Bureau of Census (1976).

[3] Public Law 95-113 (1977), Title VIII, Sec. 8(a).

The New Questions

In the spring of 1977, the panel families were asked the following sequence of questions:



G52. Did you (FAMILY) use government food stamps (commodity stamps) at any time in 1976?

1. YES

G53. How much did you pay for the stamps in 1976?

$________ per ________ (WEEK, MONTH)

G54. How much food could you buy with the stamps in 1976?

$________ per ________ (WEEK, MONTH)

G55. For how many months did you use food stamps in 1976?

________ MONTHS

(TURN TO PAGE 23, H1)

5. NO

G56. Many families who are eligible for food stamps do not get them, and we are interested in finding out why. Do you think you were eligible for food stamps at any time in 1976?

1. YES | 3. MAYBE | 8. DK | 5. NO (TURN TO PAGE 23, H1)

G57. Why didn't you (get/try to get) food stamps?

G58. Can you tell me a little more about that?

(TURN TO PAGE 23, H1)

The responses to G57 and G58 were categorized according to the following code:

1) Purchase price problem: "can't afford them," "no money," "costs too much."
2) Bonus value problem: "not a good deal," "not worth it for the return."
3) Administrative access problem: attitude of local officials, "too much red tape," "have to stand in line too long."
4) Refused: tried, but declared ineligible by welfare officials.
5) Physical access problem: transportation difficulties, "too much gas," physical disability, timing difficulties.
6) Informational access problem: "don't know how to go about applying for them."
7) "Don't need them."
8) Attitudinal factors: "don't like welfare."
9) Not ascertained, don't know: "just don't know," "never bothered," other reasons.

In the case of multiple responses, either the first mention or the most emphasized reason was coded. In general, the answers given by respondents fit clearly into a single category. There were surprisingly few problems with the definitional overlap between purchase price and bonus value. A response of "costs too much" could refer to either a purchase price or a bonus value problem, but the follow-up question (G58) usually resolved the ambiguity. The greatest difficulty in assigning responses involved distinguishing between need and attitudinal factors. Answers like "As long as I can get along without them, I will" were particularly troublesome. Such responses indicate a preference for not receiving welfare, but this preference was conditioned on the ability to meet one's perceived needs out of one's own resources. Such responses were coded in the "Don't need them" category, indicating that if a respondent's needs were great enough, he would use food stamps.

Some additional points concerning this coding procedure should be mentioned. Code 9 is a catchall category dominated by the answers of respondents who just had not thought of applying for food stamps or simply had never bothered, for no particular reason. It also includes rare reasons for nonparticipation, such as the limitation on the type of products which can be purchased with food stamps. The code for attitudinal factors (code 8) includes responses which indicated both a philosophical dislike for welfare and a fear of the stigma attached to using food stamps ("I'd be too embarassed to use them"). This latter type of response was distinguished from a response such as "The people at the welfare office embarass you and make you feel like a beggar," which would be coded 3. Finally, it was not always clear with regard to code 4 whether the respondent had been denied eligibility certification in 1976 or some earlier year, although most responses seemed to apply to 1976.

The Sample

The sample upon which the analysis was performed was made up of households residing in the continental United States who were officially in poverty in 1976. The primary reason for this restriction was to avoid any question as to the income eligibility of these households. The Department of Agriculture establishes income eligibility limits at levels where the cost of a nutritionally adequate diet equals 30 percent of a household's net income or the poverty level for that size household, whichever is higher. There is a price-adjustment lag problem in setting income eligibility limits equal to poverty levels, as can be seen in Table 4.1. That table shows the relationship between the annual poverty line for households of various sizes and the maximum net income limits for eligibility for the food stamp program.[4]

In addition, the sample was restricted to households with the same head (and wife, if applicable) between the interviewing periods of 1976 and 1977. The purpose of this was to remove ambiguity in interpreting the results. The marital status variable, along with the other demographic and economic variables, were dated as closely as possible to the spring of 1976. If a married couple which

---

[4] Several points should be mentioned concerning the income eligibility requirements for the food stamp program. First of all, the food stamp income guidelines are set on a monthly basis rather than an annual basis. For the analysis, annual household income was divided by 12 to obtain the monthly income of the household. This procedure would understate eligibility of households, for they may receive income irregularly, thus qualifying for part of the year only. Second, the poverty guidelines are based on gross income--total income before any deductions. Food stamp eligibility is based on net income--total income minus deductions allowed by the food stamp regulations. In 1976 these deductions included taxes, child care expenses necessary for employment, educational expenses, and excess shelter costs. The use of gross income would understate eligibility. Finally, households in which all members are eligible for public assistance or Supplemental Security Income are categorically eligible for food stamps, regardless of their income (or assets). However, SSI recipients in California and Massachusetts are ineligible to receive food stamps, as these states "cash out" the bonus value in the SSI checks.

The poverty thresholds reported in Table 4.1 represent a weighted average of the various poverty thresholds for families of the same size. The Census Bureau actually employs a total of 62 different non-farm poverty thresholds, based on the sex and age of the household head and the number of children in the household. For this analysis, the needs standard developed by the Survey Research Center, which is virtually identical to that of the Census Bureau, was used.

Table 4.1

COMPARISON OF FOOD STAMP INCOME ELIGIBILITY GUIDELINES AND THE POVERTY THRESHOLDS, 1976

Family size	Maximum Monthly Income for Food Stamp Eligibility	Poverty Threshold[a]
1	$230	$247
2	$310	$319
3	$450	$378
4	$570	$485
5	$690	$573
6	$810	$647

[a] This equals the annual poverty line divided by 12.

did not use food stamps divorced after the spring of 1976 and one of the two subsequent families then began to use the stamps, there would exist a discrepancy between marital status and user status. Although the restriction imposed on the sample concerning stable head (and wife, if applicable) does not eliminate all ambiguity, it was thought to be the clearest approach.

A sample of 745 households which met these requirements was selected for the analysis.

Description of Variables

Before discussing the results, a brief description of the variables employed in the analysis would be useful.

Age/Sex/Marital Status of Household Head: A measure of the basic demographic characteristics of the head of the household unit in 1976. Three age ranges are represented: under 25 years old, 25-64, and over 65--labelled young, middle-aged, and elderly, respectively.

Welfare Status: A four-category variable measuring a household's connection with local welfare agencies. The first category includes all households which received any AFDC or general assistance payments in 1976. The second category includes households which received no such payments in 1976 but had received either some welfare assistance or food stamps in 1975. The third category consists of households which received no welfare in 1975 or 1976, but received either Social Security or

Supplemental Security Income in 1976. The final category consists of the remaining households: those which received no welfare in 1975 or 1976 and received no Social Security or Supplemental Security Income in 1976.

Employment Status: The household head's self-reported current labor force attachment at the time of interview.

Number of Children Age 0-17 in the Household: As reported in the spring of 1976.

City Size: Size of the largest city in the county where the household resided at the time of interview.

Distance to Nearest City of 50,000 or More.

Transportation: A four-category variable, based on the responses to questions concerning car (or truck) ownership and the availability of public transportation within walking distance. If the respondent replied yes to both questions, the household was placed in the Private and Public Transportation category. If the answer was no to both questions the household was coded as No Transportation.

Race: A three-category variable based on the race of the household head: white, black, or other.

Region: A four-category variable based on the household's place of residence in the spring of 1976.

Monthly Purchase Price: The estimated price that the household would have to pay in order to acquire its full entitlement of food stamps, based on the coupon issuance tables in effect for January 1 to June 30, 1976, as reported in the Food Research and Action Center's "Guide to the Food Stamp Program: January, 1976." The monthly purchase price is based on a household's net countable income and family size (or, more precisely, the number of eligible food stamp recipients in the household). Reported family size as of the spring of 1976 was used as a proxy for number of eligible recipients in the household. Total annual family money income was divided by 12 for an estimate of the household's monthly income. Thus, no account was taken for allowable deductions from gross income, resulting in an overestimate of the monthly purchase price faced by the household. No account was taken of the variable purchase option.

Monthly Bonus Value: Bonus value is defined as the difference between a household's coupon allotment (the face value of the stamps) and the price which would be paid for the stamps. The purchase price was estimated as described above. The coupon allotment, which is based on family size only, was based on reported family size at the time of interview (Spring 1976).

A DESCRIPTIVE OVERVIEW

Tables 4.2 and 4.3 present the basic descriptive aspects of the sample. Table 4.2 shows the distribution of the sample and the unadjusted mean participation rates in the food stamp program by selected demographic and economic characteristics.

The composition of the poverty population follows well-established contours, with households headed by blacks, females, and the elderly being disproportionately poor. The mean participation rate of the sample was 37.8 percent, a figure virtually identical to those previously reported by Coe (1976) and the U. S. Bureau of Census (1976). Households receiving welfare had markedly higher participation rates, while households headed by unmarried men or elderly unmarried women had lower than average participation rates. Interestingly, households faced with higher purchase prices for their coupon allotments had higher unadjusted participation rates. This probably results from these households being entitled to higher bonus values, which show a positive unadjusted effect on the use of food stamps.

Table 4.3 shows the distribution of responses by nonparticipants concerning their reasons for not getting food stamps. The dominating factor emerging from this table is the extent to which poor nonparticipants do not believe that they are eligible. When asked whether they thought they were eligible for food stamps at any time in 1976, 59.3 percent of the nonparticipants responded "No" or "Don't Know." An additional 1.1 percent believed they were eligible for stamps but did not know how to go about applying for them, further underscoring the importance of lack of information. This problem of insufficient information existed across virtually all subgroups of nonparticipants. Another 6.4 percent of nonparticipants thought they were eligible but had been refused certification when they applied. Given the asset holding and work requirements imposed on food stamp recipients, these refusals are not necessarily unjustified, but it is a potentially troubling finding that households in poverty report being denied food stamps by local administrators of the program. The responses of the remaining nonparticipating households were roughly evenly distributed across the various reasons, with the exception of the catchall category of "Don't Know; Other," which accounts for 10 percent of the answers. As mentioned earlier, this

Table 4.2 (Page 1 of 2)

MEAN PARTICIPATION RATES IN FOOD STAMP PROGRAM AMONG THE POVERTY POPULATION, 1976

(N = 745)

Demographic or Program Characteristic	Unweighted Number of Observations	Weighted Percentage of Poverty Population	Unadjusted Mean Participation Rate
All	745	100.0%	37.8%
Age Sex Marital Status			
Young couple	19	0.9	85.8
Middle-aged couple	137	15.4	43.7
Elderly couple	30	6.7	37.6
Young unmarried female	73	10.0	47.5
Middle-aged unmarried female	303	28.2	56.8
Elderly unmarried female	88	24.6	20.3
Young unmarried male	41	5.6	10.9
Middle-aged unmarried Male	44	5.6	21.7
Elderly unmarried male	10	2.9	3.1
Welfare Status			
Received welfare in 1976	271	24.0	83.1
No welfare in 1976, but received welfare or food stamps in 1975	67	7.2	40.1
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	195	38.2	21.9
No welfare in 1975 or 1976	212	30.6	21.4
Employment Status			
Employed	214	25.7	35.3
Unemployed	100	9.2	52.8
Retired	88	20.1	24.1
Disabled	136	14.5	44.5
Housewife	175	25.6	45.7
Student, other	32	4.9	17.4
City Size			
500,000 or More	321	29.6	38.3
100,000-499,999	132	16.7	39.3
25,000-99,999	115	18.3	48.5
Less than 25,000	176	35.3	31.1
Distance to Nearest City of 50,000			
Less than 5 miles	218	20.5	34.9
5 - 14	230	23.1	43.6
15 - 29	66	9.8	46.0
30 - 49	60	12.3	40.7
50 or more	171	34.3	32.2

Table 4.2 (Page 2 of 2)

Demographic or Program Characteristic	Unweighted Number of Observations	Weighted Percentage of Poverty Population	Unadjusted Mean Participation Rate
Transportation			
Private transportation only	138	25.7	37.7
Private and public transportation	132	17.7	31.6
Public transportation only	347	32.7	44.8
No transportation	128	23.9	32.8
Race			
White	203	64.4	31.4
Black	520	32.9	48.0
Other	22	2.7	64.6
Region			
Northeast	77	17.0	46.1
North Central	145	23.6	29.7
South	437	46.3	40.0
West	86	13.1	33.8
Number of Children Age 0-17			
None	322	59.8	22.8
One	95	10.5	48.9
Two	91	10.2	73.5
Three	82	6.5	59.9
Four	77	7.1	48.2
Five or more	78	5.8	71.0
Monthly Bonus Value			
Less than $20	154	32.4	24.2
$20 - 29	81	14.3	29.7
$30 - 39	63	9.7	26.7
$40 - 49	64	9.7	35.0
$50 - 74	117	11.3	54.0
$75 - 99	100	9.1	65.1
$100 - 149	91	7.5	53.1
$150 or more	75	6.0	61.4
Monthly Purchase Price			
Zero	18	2.9	10.2
$1 - 19	46	7.9	10.4
$20 - 34	111	14.2	34.9
$35 - 49	164	32.8	26.6
$50 - 75	135	16.7	45.4
$75 - 99	85	7.5	63.4
$100 - 149	100	10.9	68.0
$150 or more	86	7.1	45.5

Table 4.3 (Page 1 of 3)

WEIGHTED DISTRIBUTION OF RESPONSES BY NONPARTICIPANTS IN FOOD STAMP PROGRAM CONCERNING THEIR ELIGIBILITY AND REASONS FOR NOT GETTING FOOD STAMPS, 1976

(N=348)

Demo-grapgic or Program Charac-teristic	Number of Non-Parti-cipants	Did Not Think Eligible	Pur-chase Price	Bonus Value	Admini-strative Hassle	Tried, but Refused	Phys-ical Access Problem	Don't Know How To Apply	Don't Need Them	Atti-tudinal Factors	Don't Know, Other
All	348	59.3%	5.3%	1.6%	3.5%	6.4%	2.4%	1.1%	4.8%	5.6%	10.0%
Age Sex Marital Status											
Young couple	6	33.1	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	59.9
Middle-aged couple	69	61.1	0.9	1.1	3.2	10.1	0.4	0.2	2.8	6.7	13.3
Elderly couple	16	59.3	9.1	11.2	0.0	11.2	0.0	0.0	0.0	0.0	9.1
Young unmarried female	30	82.9	0.2	0.8	1.3	9.5	0.0	0.0	0.0	5.3	0.0
Middle-aged unmarried female	88	50.7	11.8	0.0	6.9	7.2	0.5	0.2	0.5	10.6	11.6
Elderly unmarried female	62	59.0	4.4	0.0	0.6	4.9	6.6	3.0	6.6	5.1	9.7
Young unmarried male	35	63.1	1.8	0.0	3.2	5.3	0.0	0.0	18.1	0.6	7.9
Middle-aged unmarried male	34	50.4	1.4	0.4	16.0	0.4	2.3	0.0	1.3	6.5	21.3
Elderly unmarried male	9	58.7	13.2	14.1	0.0	0.0	0.0	0.0	13.8	0.0	0.0
Welfare Status											
Received welfare in 1976	40	32.0	16.0	1.2	10.1	8.3	1.2	0.0	0.0	0.0	31.4
No welfare in 1976, but received welfare or food stamps in 1975	30	47.9	11.0	0.0	3.7	12.4	2.5	0.3	14.0	0.0	7.8
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	133	57.5	6.7	2.9	2.0	5.0	4.4	2.2	3.8	4.6	10.9
No welfare in 1976 or 1975	145	68.2	0.8	0.4	4.2	6.7	0.1	0.0	5.1	8.8	5.7

Table 4.3 (Page 2 of 3)

Demo-grapgic or Program Charac-teristic	Number of Non-Parti-cipants	Did Not Think Eligible	Pur-chase Price	Bonus Value	Admini-strative Hassle	Tried, but Refused	Phys-ical Access Problem	Don't Know How To Apply	Don't Need Them	Atti-tudinal Factors	Don't Know, Other
Employment Status											
Employed	116	62.2	0.3	0.5	3.1	10.5	0.6	0.2	0.0	7.7	14.8
Unemployed	39	76.4	1.1	0.0	8.1	1.7	0.0	0.8	10.2	0.6	1.3
Retired	62	50.7	8.8	3.2	1.7	10.1	6.2	[illegible].0	4.9	1.8	8.6
Disabled	57	59.6	5.0	5.0	6.3	5.6	1.3	0.0	0.0	0.0	17.3
Housewife	54	60.6	9.8	0.4	0.7	1.1	2.6	0.0	6.8	11.0	7.0
Student, other	20	56.4	2.2	0.0	11.4	0.0	0.0	0.0	20.2	8.8	0.8
City Size											
500,000 or More	135	57.7	4.1	0.3	6.2	3.7	3.4	3.4	6.5	7.5	7.5
100,000 - 499,999	55	63.4	6.1	0.5	6.9	6.4	0.0	0.0	5.8	5.3	5.6
25,000 - 99,999	55	53.3	6.0	0.0	3.3	14.4	4.7	0.2	0.6	3.7	13.6
Less than 25,000	102	61.0	5.7	3.8	0.1	5.4	1.7	0.0	4.8	5.1	12.5
Distance to Nearest City of 50,000											
Less than 5 miles	97	46.4	9.1	0.3	5.2	8.0	4.6	0.0	7.2	4.8	14.4
5 - 14	91	59.6	4.3	0.2	5.5	8.0	0.4	4.8	6.6	4.3	6.4
15 - 29	29	64.4	1.5	0.0	13.0	1.5	0.0	0.0	7.2	7.6	4.6
30 - 49	32	63.6	0.0	1.2	0.0	7.1	11.8	0.2	0.0	9.3	6.7
50 or more	99	63.9	6.2	3.7	0.4	5.5	0.0	0.0	3.2	5.2	11.8
Transportation											
Private transportation only	75	62.8	2.2	1.1	1.1	9.1	2.6	0.0	0.3	8.0	12.8
Private and public transportation	79	66.7	1.2	0.1	6.0	5.0	0.3	0.0	2.0	9.2	9.6
Public transportation only	125	47.0	8.9	0.2	5.6	9.1	3.4	3.4	8.7	4.2	9.4
No transportation	69	64.3	7.3	4.9	1.5	1.8	2.8	0.1	6.8	2.2	8.2
Race											
White	132	62.8	2.9	1.9	1.9	6.4	1.6	0.0	5.1	7.7	9.3
Black	208	48.9	11.6	1.0	7.7	6.4	4.6	3.9	4.2	0.6	11.2
Other	8	74.0	0.0	0.0	0.0	5.6	0.0	0.0	0.0	0.0	20.6

Table 4.3 (Page 3 of 3)

Demographic or Program Characteristic	Number of Non-Participants	Did Not Think Eligible	Purchase Price	Bonus Value	Administrative Hassle	Tried, but Refused	Physical Access Problem	Don't Know How To Apply	Don't Need Them	Attitudinal Factors	Don't Know, Other
Region											
Northeast	34	41.2	9.1	0.0	8.0	6.1	6.9	0.4	0.0	16.1	12.4
North Central	71	63.3	2.7	2.6	3.0	3.1	0.0	3.6	8.1	6.4	7.3
South	198	59.3	6.7	2.2	2.8	7.2	3.2	0.0	2.7	2.7	13.3
West	45	71.0	1.5	0.0	2.1	10.6	0.0	0.0	10.0	2.4	2.3
Number of Children, Age 0-17											
None	220	59.8	5.7	2.1	1.9	5.3	3.1	1.4	6.4	5.6	8.8
One	37	51.1	6.5	0.8	3.7	17.6	0.4	0.0	0.0	9.2	12.5
Two	24	75.1	3.0	0.0	15.8	1.9	1.1	0.0	0.0	0.0	3.0
Three	20	55.9	2.5	0.0	9.5	2.0	1.2	0.0	0.0	15.5	1.3
Four	26	71.4	1.7	1.2	9.5	8.3	0.0	0.6	1.5	0.0	5.8
Five or more	21	34.5	4.1	0.0	4.8	7.9	0.0	0.0	0.0	0.0	48.6
Monthly Bonus Value											
Less than $20	106	58.7	5.5	1.6	1.3	3.4	4.1	2.4	8.4	5.3	9.1
$20 - 29	53	54.2	4.7	4.0	4.4	15.4	3.4	0.0	2.6	8.3	3.3
$30 - 39	37	50.9	4.9	1.2	1.1	8.3	0.8	0.0	0.0	15.0	17.5
$40 - 49	30	68.2	6.8	0.0	0.0	5.2	0.0	0.0	9.1	0.5	10.3
$50 - 74	45	74.8	1.3	0.9	3.7	2.8	0.7	0.7	1.1	5.4	8.7
$75 - 99	31	67.9	14.0	1.4	10.0	3.7	0.6	0.0	0.0	0.0	2.3
$100 - 149	27	48.6	3.6	0.0	22.0	3.8	1.1	0.0	0.0	0.0	20.9
$150 or more	19	59.8	2.6	1.8	1.6	10.4	0.0	0.0	0.0	0.0	22.8
Monthly Purchase Price											
Zero	14	88.4	0.0	0.0	1.7	0.7	0.0	0.0	0.0	0.0	9.2
$1 - 19	33	69.0	0.0	0.7	0.8	0.2	0.9	0.0	8.1	11.0	9.5
$20 - 34	58	68.2	4.5	0.0	4.0	8.1	0.5	0.5	0.0	4.8	9.4
$35 - 49	99	54.4	9.0	1.8	1.4	4.2	4.0	2.5	8.7	5.3	8.7
$50 - 74	54	47.8	0.9	5.3	9.7	17.8	4.0	0.0	2.7	4.2	7.5
$75 - 99	24	61.5	19.1	0.0	0.0	3.0	0.0	0.0	0.0	7.3	8.7
$100 - 149	29	60.0	0.0	0.0	5.0	5.9	2.2	0.6	1.6	11.6	13.1
$150 or more	37	56.3	2.4	1.1	8.1	6.6	0.0	0.0	0.0	0.0	25.3

category was dominated by households which replied that they simply did not know why they hadn't tried to get stamps, or had never thought of it, or just had never bothered to apply. Although one might wish that for analysis purposes these answers had been more specific, they are probably an accurate reflection of the decision-making process concerning participation.

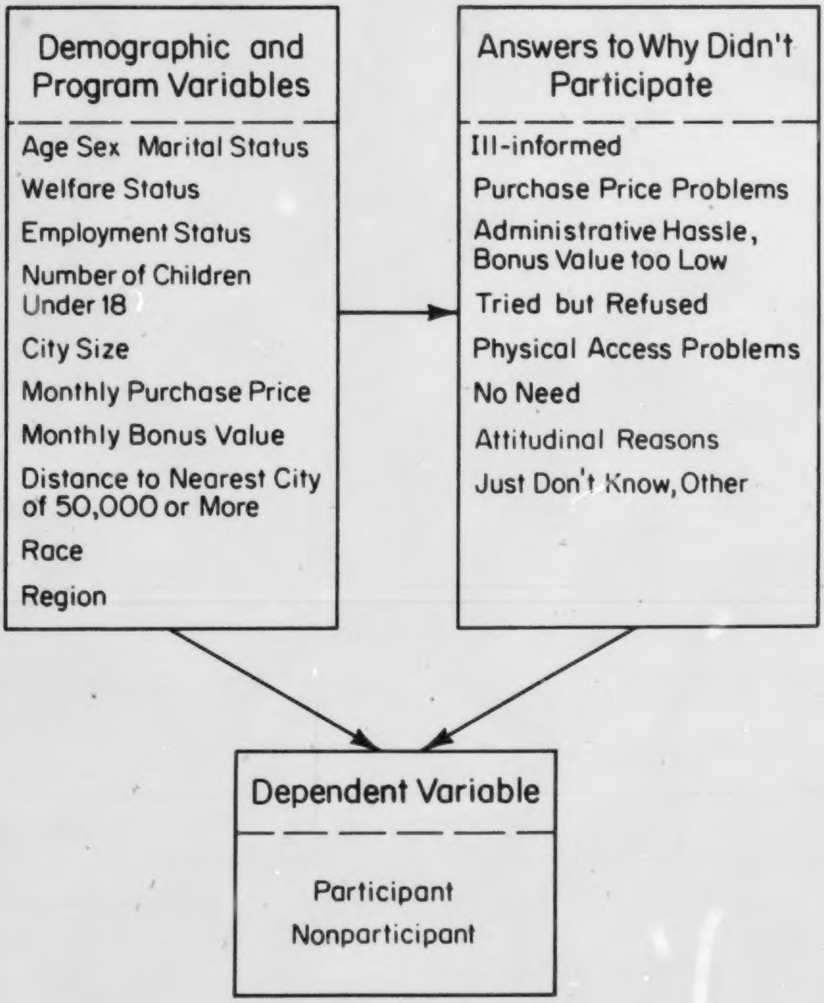
THE ANALYTIC MODEL

Previous empirical work on participation in the food stamp program has identified certain demographic and economic variables which were significant in predicting participation in the food stamp program. MacDonald (1977) found welfare status, connection to the labor market, and bonus value to be significant in determining whether a household chose to use food stamps. Coe (1976) concluded that welfare status and the age/sex/marital status of the household head were the most powerful predictors of participation, while bonus value was not a significant factor. Peskin found bonus value to be a significant variable, but her sample was limited to households receiving AFDC, general assistance, or Supplemental Security Income payments. Clarkson (1976), like Coe, found nominal bonus value to be insignificant, but an estimated cash equivalent value of the nominal bonus value was significant. However, he employed a very limited set of independent variables, mainly due to the aggregate (as compared to individual) nature of his data.

As this brief description points out, previous research has yielded divergent conclusions as to which demographic and economic variables are significant predictors of food stamp participation. A more fundamental question left unanswered by previous research involves the interpretation of variables which are found to be significant. If AFDC recipients are more likely to participate in the food stamp program, is it because they are better informed about their eligibility or because they have less adverse feelings toward the receipt of welfare? The data have not existed to allow more than reasoned speculation on the answers to questions such as this.

The empirical model estimated in this chapter has been designed to address both of the concerns noted above. The model is diagrammed in Figure 4.1. The first step in the estimation of this model is to regress participation status on the set of demographic and program variables, which will enable us to determine which of these characteristics are significant predictors of participation. The results of this regression show the total effect of these variables on participation, and they are comparable to the regression results of previous

FIGURE 4.1
BASIC MODEL FOR FOOD STAMP PARTICIPATION


Demographic and Program Variables
Age Sex Marital Status
Welfare Status
Employment Status
Number of Children Under 18
City Size
Monthly Purchase Price
Monthly Bonus Value
Distance to Nearest City of 50,000 or More
Race
Region
Answers to Why Didn't Participate
Ill-informed
Purchase Price Problems
Administrative Hassle, Bonus Value too Low
Tried but Refused
Physical Access Problems
No Need
Attitudinal Reasons
Just Don't Know, Other
Dependent Variable
Participant
Nonparticipant

work. The second step in the estimation process (which will not be shown) is to add to this first equation a series of dummy variables representing the reasons given by nonparticipants for not getting food stamps. This equation is tautological, resulting from the fact that the participants in the program did not answer the nonparticipant questions. By definition, one of the independent variables exactly matches one category of the dependent variable, and each of the category of responses by nonparticipants perfectly predicts nonparticipation. This step allows us to decompose the total effect of the demographic and program variables on participation into the various reasons for nonparticipation.[5] Consequently, we will be able to quantify precisely how the demographic and program variables affect participation. This quantification will come from the third step of the estimation procedure, in which the responses to the nonparticipation questions are regressed on the background and program variables.

This property can perhaps best be shown algebraically. The basic equations of the estimation model are:

$$(1)\quad Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots. + \beta_9 X_9 + \beta_{10} X_{10}$$

$$(2)\quad X_1 = \sigma_1 + \gamma_1 X_{10}$$

$$(3)\quad X_2 = \sigma_2 + \gamma_2 X_{10}.$$

$$\vdots$$

$$(9)\quad X_9 = \sigma_9 + \gamma_9 X_{10}$$

where Y = 1 if a participant, zero otherwise
X_1 = 1 if respondent did not believe he was eligible, zero otherwise
X_2 = 1 if respondent reported a purchase price problem, zero otherwise
⋮
X_9 = 1 if respondent replied "don't know" to nonparticipation question, zero otherwise
X_{10} = A vector of demographic and program variables

Because all participants in the program will be coded zero for all of the different reasons for nonparticipation, and all the nonparticipants will receive a code of 1 on one of these reasons, the relationship between Y and X through X can be expressed definitionally as:

$$(10)\quad Y = 1 - X_1 - X_2 - \ldots - X_9$$

Consequently, in Equation 1 we have,

---

[5] To those readers familiar with path models, this estimation procedure should be quite straightforward. For a formal, but simple, demonstration of the properties of this type of procedure, see Duncan (1976), p. 219.

$$\beta_0 = 1,$$
$$\beta_1 = \beta_2 = \ldots = \beta_9 = -1, \text{ and}$$
$$\beta_{10} = 0$$

We wish to show that the total effect of the demographic and program variables (X_{10}) can be accounted for by the answers to the nonparticipation questions. To see this, we substitute Equation 2 through 9 into Equation 1, yielding:

$$(11) \quad y = \beta_0 + \beta_1 (\sigma_1 + \gamma_1 X_{10}) + \beta_2(\sigma_2 + \gamma_2 X_{10}) + \ldots + \beta_9(\sigma_9 + \gamma_9 X_{10}) + \beta_{10} X_{10}$$

Rearranging, the total effect on participation of a unit change in X_{10} is:

$$(12) \quad Y = C_0 + (\beta_1\gamma_1 + \beta_2\gamma_2 + \ldots + \beta_9\gamma_9 + \beta_{10})X_{10}$$

where $C_0 = \beta_0 + \beta_1\sigma_1 + \beta_2\sigma_2 + \ldots + \beta_9\sigma_9$

Since $\beta_1 = \beta_2 = \ldots = \beta_9 = -1$ and $\beta_{10} = 0$, equation (12) reduces to:

$$(13) \quad Y = C_0 - (\gamma_1 + \gamma_2 + \ldots + \gamma_9)X_{10}$$

Consequently, the total effect on participation of a unit of change in the demographic and program variables can be accounted for by the equations which regress the reasons for nonparticipation on the demographic and program variables.

Before presenting the results, two points should be mentioned concerning the coding of the responses. Nonparticipants who replied that they thought they were eligible for food stamps but did not get them because they did not know how to apply for them were grouped with those respondents who said they did not think or did not know that they were eligible. The small number of respondents in the former group argued against analyzing them separately, and the policy prescription for their problem is similar to that for those who did not think they were eligible, namely, improved information. Second, the small number of respondents who replied that a low bonus value discouraged them from participating dictated that they be grouped with another category. Although their complaint is closely linked to that concerning too high a purchase price, it was thought desirable to keep the purchase price category as pure as possible due to the recent legislative emphasis on that aspect of nonparticipation. Consequently, mentions of the bonus value problem were grouped with the administrative hassle category.

THE RESULTS

Table 4.4 presents the results when participation status was regressed on the set of demographic and program characteristics of the household.[6] In general, the results correspond closely to what Coe (1976) found for participation in 1974. The age/sex/marital status of the household head and the welfare status of the household stood out as significant predictors of participation, as did the number of children under 18 in the household. The two economic variables (monthly purchase price and monthly bonus value) were insignificant in predicting participation, as were the two access variables (distance to the nearest city of 50,000 or more and the availability of transportation). Race was likewise insignificant in predicting participation. The employment status of the household head was also insignificant, a finding which conflicts with Coe's results for 1974. Overall, the equation does a credible job of predicting participation, as indicated by the adjusted R^2 of .338.

With respect to the age/sex/marital status of the household head, two points stand out. First, unmarried men of all ages were less likely to use food stamps than middle-aged married couples. Second, unmarried elderly persons of both sexes were also less likely to use food stamps. This stands in sharp contrast to married elderly people, who were not significantly less likely to participate in the program.

With respect to the welfare status of the household, the results indicate that recent contact with the public transfer income system had a positive effect on participation. This was especially true for households which received AFDC or general assistance payments in 1976--such households had a 61.6 percent greater probability of using food stamps than households which received no public transfer income in 1976 nor any AFDC, general assistance, or food stamps in 1975.

Why Poor Families Don't Participate

The complete results of the final step of the estimation procedure--regressing the answers given to the nonparticipation questions on the demographic and program variables--are given in Table 4.5.[7] Several interesting results

---

[6] The careful reader will have noted that the number of observations for these results differs from that reported in Table 4.2 and 4.3 (742 versus 745). This was due to the selection of a different missing data option for the two tables. The slight discrepancy should not affect the results.

[7] The sum of the coefficients across the various responses for a particular subgroup will equal the negative of the coefficient on participation in Table 4.4

Table 4.4 (Page 1 of 2)

TOTAL EFFECTS OF DEMOGRAPHIC AND PROGRAM VARIABLES ON PARTICIPATION IN THE FOOD STAMP PROGRAM AMONG THE POVERTY POPULATION, 1976

(N=742, MEAN=37.5%)

Demographic and Program Variables (omitted category)	Whether Used Stamps in 1976	Standard Errors
Age Sex Marital Status		
Young couple	.521**	.157
(Middle-aged couple)	-	-
Elderly couple	-.043	.087
Young unmarried female	-.045	.077
Middle-aged unmarried female	-.135*	.065
Elderly unmarried female	-.263**	.084
Young unmarried male	-.207*	.092
Middle-aged unmarried male	-.251**	.087
Elderly unmarried male	-.358**	.122
Welfare Status		
Received welfare in 1976	.616**	.053
No welfare in 1976, but received welfare or food stamps in 1975	.210**	.070
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	.122*	.056
(No welfare in 1976 or 1975)	-	-
Employment Status		
(Employed)	-	-
Unemployed	.023	.061
Retired	.023	.066
Disabled	.004	.059
Housewife	-.009	.056
Student, other	-.078	.080
City Size		
(500,000 or More)	-	-
100,000 - 499,999	.059	.048
25,000 - 99,999	.015	.054
Less than 25,000	-.123*	.061

Table 4.4 (Page 2 of 2)

Demographic and Program Variables (omitted category)	Whether Used Stamps in 1976	Standard Errors
Distance to Nearest City of 50,000		
(Less than 5 miles)	-	-
5 - 14	.060	.048
15 - 29	.089	.063.
30 - 49	.078	.066
50 or more	.108+	.063
Transportation		
(Private transportation only)	-	-
Private and public transportation	-.061	.058
Public transportation only	-.018	.055
No transportation	-.011	.048
Race		
(White)	-	-
Black	.012	.040
Other	.190+	.098
Region		
Northeast	-.078	.052
North Central	-.119**	.040
(South)	-	-
West	-.074	.055
Number of Children, Age 0-17	.061*	.030
Monthly Purchase Price	-.0010	.0007
Monthly Bonus Value	-.0012	.0008
R^2 (adjusted)	.338	

Significance Levels:

**.01 *.05 +.10

Table 4.5 (Page 1 of 3)

REGRESSIONS CONCERNING THE REASONS WHY HOUSEHOLDS DIDN'T PARTICIPATE IN FOOD STAMP PROGRAM IN 1976, POVERTY POPULATION

(N=742)

Demographic and Program Variables (omitted category)	Ill-informed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Age Sex Marital Status								
Young couple	-.374*	-.040	-.038	-.053	-.000	-.061	-.027	.072
(Middle-aged couple)	-	-	-	-	-	-	-	-
Elderly couple	.151	-.048	.061	-.035	-.029	-.018	-.013	-.026
Young unmarried female	.147+	-.040	-.004	.030	.002	-.075*	-.011	-.003
Middle-aged unmarried female	.086	.004	.017	.020	.003	-.042	.040	.008
Elderly unmarried female	.255**	-.060	-.006	-.013	.046+	.004	.017	.021
Young unmarried male	.126	-.015	-.003	.007	.002	.070+	-.056	.073
Middle-aged unmarried male	.133	-.036	.102**	-.034	.008	-.031	.006	.104*
Elderly unmarried male	.282*	.053	.126*	-.072	-.015	.095+	-.024	-.087
Welfare Status								
Received welfare in 1976	-.484**	-.002	-.035	-.026	-.004	-.038+	-.079**	.050
No welfare in 1976, but received welfare or food stamps in 1975	-.263**	.037	-.042	.030	-.005	.049+	-.061+	.045
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	-.121*	.016	.003	-.029	.004	-.044*	-.032	.081*
(No welfare in 1976 or 1975	-	-	-	-	-	-	-	-

Table 4.5 (Page 2 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Employment Status								
(Employed)	-	-	-	-	-	-	-	-
Unemployed	.089	-.007	.022	-.064*	.000	.059*	-.032	-.089*
Retired	-.081	.052+	-.011	.048	.031	.031	-.031	-.061
Disabled	.063	-.011	.018	-.019	-.008	.011	-.030	-.027
Housewife	.025	.053*	-.015	-.043	.000	.046*	.023	-.079*
Student, other	-.004	.006	.072*	-.092*	.002	.160**	.023	-.086+
City Size								
(500,000 or more)	-	-	-	-	-	-	-	-
100,000 - 499,999	-.061	.025	.011	.011	-.023	-.000	-.008	-.014
25,000 - 99,999	-.104+	.035	-.013	.060*	-.009	.007	-.020	.027
Less than 25,000	-.057	.041	-.008	.040	-.002	.041+	-.009	.076*
Distance to Nearest City of 50,000								
(Less than 5 miles)	-	-	-	-	-	-	-	-
5 - 14	.052	-.028	.015	-.005	-.027+	-.008	-.010	-.051+
15 - 29	.081	-.050+	.033	-.045	-.025	-.019	.025	-.089*
30 - 49	.143*	-.072*	-.009	-.055+	.033+	-.058*	.048	-.108**
50 or more	.119+	-.035	-.007	-.047	-.041*	-.062*	.030	-.064+
Transportation								
(Private transportation only)	-	-	-	-	-	-	-	-
Private and public transportation	.086	-.005	.013	-.018	-.024	-.036	.023	.023
Public transportation only	.008	.011	.023	.015	-.035*	.028	-.022	-.010
No transportation	.001	.0[illegible]	.052*	-.021	-.010	.044*	-.049*	-.033
Race								
(White)	-	-	-	-	-	-	-	-
Black	-.027	.047**	.005	-.028	.032**	-.009	-.011	-.0[illegible]2
Other	-.050	-.029	-.020	-.061	.001	-.028	-.052	.049

Table 4.5 (Page 3 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Region								
Northeast	-.029	.026	.013	-.010	.037*	-.021	.073*	-.011
North Central	.127**	-.022	.008	-.017	-.012	.027+	.024	-.016
(South)	-	-	-	-	-	-	-	-
West	.115+	-.007	-.016	.024	.010	.029	-.008	-.073*
Number of Children, Age 0-17	-.005	-.034**	-.017	-.024+	-.008	.011	-.002	.020
Monthly Purchase Price	-.0003	.0005	.0004	.0006+	.0002	-.0002	-.0001	-.0002
Monthly Bonus Value	.0008	.0004	.0006*	.0002	.0001	-.0004	-.0003	-.0004
R^2 (Adjusted)	.182	.046	.033	.027	.066	.116	.061	.033

Significance Levels:

**.01 *.05 +.10

emerge. With other characteristics controlled for, elderly unmarried household heads of either sex were significantly more likely than middle-aged married couples to think they were not eligible for food stamps or didn't know how to apply for them. In contrast, elderly married couples did not differ significantly from middle-aged couples with respect to their information about the program. The welfare status of the household also had a strong effect on a family's belief about their eligibility. Heads of households which received AFDC or general assistance payments in 1976 were 48 percent more likely to think that they were eligible for food stamps than heads of households which received no public transfer income. This effect of better information weakened as a household was further removed from the welfare system, but it was still significant. Finally, there was some evidence that information concerning eligibility was worse in rural areas, as respondents living further than 30 miles from a city of 50,000 were more likely to believe that they were not eligible for food stamps.

There were few significant differences among households in reporting a purchase price problem. Blacks and retired persons were more likely to report such a problem, while the probability declined as the number of children in the household under 18 years old increased.

Unmarried men over the age of 24 and students were more likely to attribute not getting food stamps to administrative hassles. On the other hand, students were less likely to have tried to get stamps and been officially refused. Perhaps the ones who endure the application process are better informed of their rights and thus push harder for certification. The probability of trying but being refused also decreases as the number of children increases.

Elderly unmarried females, blacks, and persons living in the Northeast region of the country were more likely to report physical access problems as a bar to participation. Somewhat surprisingly, access to stamps did not seem to be much of a problem to people living 50 miles from a city with a population of at least 50,000 or to those who depended entirely on public transportation.

Young and elderly unmarried men were more likely than middle-aged married couples to reply that they didn't get food stamps because they didn't think they needed them. Those households which received welfare, Social Security, or Supplemental Security Income in 1976 were less likely than nonrecipients to

---

for that subgroup. This follows directly from Equation 13 in the text.

report that they did not need stamps. On the other hand, those not receiving welfare in 1976 but who had received it the previous year were more likely than others to reply that they didn't need food stamps, perhaps reflecting their improved (although still impoverished) economic condition which led them to stop receiving welfare. This might have resulted from changes in the composition of their families between 1975 and 1976. Students were much more likely to reply that they didn't need food stamps, probably because many were able to rely on their parents in an emergency. Unemployed household heads were also more likely than employed persons to say they didn't need the stamps, perhaps reflecting an ability to draw on resources accumulated when working. Surprisingly, housewives were also more likely than employed household heads to say they didn't need food stamps.

Finally, respondents from households which had received welfare, either in 1976 or 1975, were less likely than those from households which had received no public transfer income to report that negative attitudes toward receiving welfare resulted in their not getting food stamps. This is as expected, since the first group's attitudes about welfare were not sufficiently adverse to prevent them from receiving AFDC or general assistance.

Accounting for Differences in Participation Rates

We now turn to the issue of which of these different reasons for nonparticipation can account for the differences in participation rates among various subgroups of the poverty population and, perhaps more important, how much of the differences can they account for. Table 4.6 addresses this issue; it combines the significant (at the 10 percent level) coefficients from Tables 4.4 and 4.5. From Table 4.4 we find which subgroups of the poverty population differed significantly in their participation rates, and then from Table 4.5 we account for that difference with the significant differences in the reasons for nonparticipation. (If we took all of the results from Table 4.5, we could account for all of the difference in participation rates. This would be our best guess estimate. However, we would not have much confidence in the differences we have accounted for with insignificant results.) The numbers in Table 4.6 can be interpreted as the percentage difference in the participation rates which can be accounted for by the particular reason for nonparticipation, or, in other words, how much the participation rates would be equalized if the subgroup were equalized on that particular aspect of nonparticipation. (The interpretation of the continuous variables is somewhat different. This will be discussed when we

Table 4.6 (1 of 3)

ALLOCATION OF REASONS FOR DIFFERING PARTICIPATION RATES IN FOOD STAMP PROGRAM IN 1976, POVERTY POPULATION

(N=742)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Age Sex Marital Status								
Young couple	-71.8	-	-	-	-	-	-	-
(Middle-aged couple)	-	-	-	-	-	-	-	-
Elderly couple	-	-	-	-	-	-	-	-
Young unmarried female	-	-	-	-	-	-	-	-
Middle-aged unmarried female	-	-	-	-	-	-	-	-
Elderly unmarried female	97.0	-	-	-	17.5	-	-	-
Young unmarried male	-	-	-	-	-	33.8	-	-
Middle-aged unmarried male	-	-	40.6	-	-	-	-	41.4
Elderly unmarried male	78.6	-	35.2	-	-	26.5	-	-
Welfare Status								
Received welfare in 1976	-78.8	-	-	-	-	-6.2	-12.8	-
No welfare in 1976, but received welfare or food stamps in 1975	-125.00	-	-	-	-	23.3	-29.0	-
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	-99.8	-	-	-	-	-36.1	-	66.4
(No welfare in 1976) or 1975	-	-	-	-	-	-	-	-

Table 4.6 (Page 2 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Employment Status								
(Employed)	-	-	-	-	-	-	-	-
Unemployed	-	-	-	-	-	-	-	-
Retired	-	-	-	-	-	-	-	-
Disabled	-	-	-	-	-	-	-	-
Housewife	-	-	-	-	-	-	-	-
Student, other	-	-	-	-	-	-	-	-
City Size								
(500,000 or more)	-	-	-	-	-	-	-	-
100,000 - 499,999	-	-	-	-	-	-	-	-
25,000 - 99,999	-	-	-	-	-	-	-	-
Less than 25,000	-	-	-	-	-	33.3	-	61.8
Distance to Nearest City of 50,000								
(Less than 5 miles)	-	-	-	-	-	-	-	-
5 - 14	-	-	-	-	-	-	-	-
15 - 29	-	-	-	-	-	-	-	-
30 - 49	-	-	-	-	-	-	-	-
50 or more	110.2	-	-	-	-38.0	-57.4		-59.3
Transportation								
(Private transportation only)	-	-	-	-	-	-	-	-
Private and public transportation								
Public transportation only	-	-	-	-	-	-	-	-
No transportation	-	-	-	-	-	-	-	-
Race								
(White)	-	-	-	-	-	-	-	
Black	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-

Table 4.6 (Page 3 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Region								
Northeast	-	-	-	-	-	-	-	-
North Central	106.7	-	-	-	-	22.7	-	-
(South)	-	-	-	-	-	-	-	-
West	-	-	-	-	-	-	-	-
Number of Children, Age 0-17	-	-55.7	-	-39.3	-	-	-	-
Monthly Purchase Price	-	-	-	-	-	-	-	-
Monthly Bonus Value	-	-	-	-	-	-	-	-

reach the results for the number of children variable.) To illustrate, we will take the -71.8 figure entered in the ill-informed category for young couples. This figure was derived by dividing the .521 coefficient from Table 4.4, representing the difference in the adjusted participation rate of young couples and the rate of the omitted group of middle-age couples, into the -.374 coefficient in the ill-informed column of Table 4.5, which represents the adjusted difference from middle-aged couples in the probability of being ill-informed about eligibility. This result, -71.8, can be interpreted as follows: the difference in the participation rate between young couples and middle-aged couples would be reduced by 71.8 percent if both groups were equally informed about their eligibility (or how to apply) for food stamps. With this in mind, let us turn to a detailed discussion of the results, focusing our attention on the age/sex/marital status, welfare status, and number of children variables.

It was found above that households headed by elderly (65 or over) unmarried females had a significantly lower participation rate than households headed by middle-aged married couples. From Table 4.6, we see that the primary reason for this lower participation rate was poor information concerning eligibility. In fact, if elderly unmarried females had been as well informed about their eligibility as middle-aged married couples, their participation rate would have been virtually equivalent to that of the latter group, as 97.0 percent of the difference can be attributed to differences in information. In addition, elderly unmarried females were more likely to report that physical access problems prevented participation, and this accounted for 17.5 percent of the difference in participation rates. Combined, these results indicate that if elderly unmarried females had equal information about and access to food stamps, their participation rate would actually have been 14.5 percent higher than that of middle-aged married couples.

Households headed by unmarried men also had significantly lower participation rates than those of middle-aged married couples. The reasons for this differed somewhat by age. For elderly unmarried men, poor information was the dominating factor, as it was for elderly unmarried females, accounting for almost 80 percent of the difference in participation. In addition, elderly unmarried men were more likely than middle-aged married couples to complain about low bonus values, and this accounted for 35 percent of the difference in their participation rates. Furthermore, these men were more likely to feel that they didn't need food stamps, and this accounted for 26.5 percent of the difference in their participation rate from that of middle-aged couples.

The beliefs of unmarried men under 65 and middle-aged couples about their eligibility for food stamps did not differ significantly. But middle-aged unmarried men were more likely to have run into administrative hassles,[8] and they were also more likely to say that applying for stamps had just not occurred to them. Each of these factors accounted for about 40 percent of the difference in their participation rates. Finally, unmarried men under the age of 25 were more likely to think that they didn't need food stamps. This accounted for 33.8 percent of the difference in their participation rate, a figure roughly equal to that of elderly unmarried men.

Turning to the welfare status variable, we see that differences in information again dominate the results. All of the groups who received some kind of public transfer income (AFDC, general assistance, Social Security, or Supplemental Security Income in 1976 or AFDC, general assistance, or food stamps in 1975) were much more likely to think that they were eligible for food stamps than the group which did not receive income of this kind. For example, Social Security and Supplemental Security Income recipients would have had participation rates equal to that of the no-public-transfer-income households if they had been as poorly informed about their eligibility as the latter group. In addition, Social Security and SSI recipients were less likely to report that they didn't need food stamps. If the households with no public transfer income had perceived themselves to be as needy as Social Security and SSI households, the difference in their participation rates would have decreased by 36.1 percent.

Differences in belief about eligibility more than accounted for the entire difference in participation rates between the no-welfare households and the households not currently receiving welfare but which had received it the previous year. If these two groups had held identical beliefs about their eligibility, the past welfare recipients would have had participation rates 25 percent lower than the no-welfare households. In addition, past welfare recipients were less likely to hold adverse feelings about receiving welfare, and this accounted for 29 percent of the difference in participation rates. On the other hand, they were more likely to say that they didn't need food stamps. If they had felt as needy as the no-welfare households, the difference in participation rates between the two grouops would have increased 23.2 percent.

---

[8] Although this figure appears in the same column as the 35.2 percent figure for elderly unmarried men, we have attributed these figures to different reasons--too low a bonus value for the elderly and administrative hassle for the middle-aged. The reason for this comes from Table 4.3, showing the breakdown in the distribution of answers to the nonparticipation questions. No elderly men responded that administrative hassles were a problem, while virtually no middle-aged men replied that low bonus values were the reason for nonparticipation.

Current welfare recipients were 61.6 percent more likely to use food stamps in 1976 than households which received no public transfer income. Seventy-nine percent of this difference can be attributed to the fact that current welfare recipients were better informed about their eligibility. In other words, if both groups had been equally well informed about their eligibility, current welfare recipients would have been only 13 percent more likely to use food stamps. Furthermore, current welfare recipients were less likely to have negative attitudes toward receiving food stamps and were less likely to respond that they didn't need them. These two factors accounted for an additional 19 percent of the difference in participation rates between the two groups.

We saw in Table 4.4 that the probability of participation in the food stamp program increased 6.1 percent with each additional child under the age of 18 in the household. A little more than half of this increase (55.6 percent) results from the fact that the probability of reporting purchase price problems decreases as the number of children increases. An additional 39.3 percent of this increase occurs because the probability of being refused food stamps decreases as the number of children increases. Better information was not a significant factor here.

The Asset Limitation on Eligibility

Income is not the only criterion of eligibility for food stamps. According to the regulations governing the program in 1976, a household was ineligible for stamps if it had countable assets in excess of $1,500. If the household had two or more people and at least one of these people was age 60 or older, then the asset ceiling was raised to $3,000. For households in which all members were eligible for public assistance or SSI payments, the asset test for eligibility did not apply. Not all assets of a household were counted for food stamp eligibility purposes. The most commonly exempted assets were: the house in which the household resided, one licensed motor vehicle and any other vehicle necessary to earn a living, personal belongings and household goods, the cash value of life insurance policies and pension funds, and income-producing real property.

One might think that households in poverty would be little troubled by the asset test for eligibility. However, a report recently released by Mathematica[9] estimates that an astonishing 32 percent of income-eligible households are ineligible for food stamps because of too many assets. Although the figure covers all income-eligible households, not just those below the poverty line, the results for households below the poverty line also show a large amount of ineligibility. For example, among all households with incomes between 50 and 100 percent of the poverty level, with a head between the ages of 25 and 44 who was neither self-employed nor salaried, and with an annual asset income of less than $100, over 25 percent were estimated to be disqualified from the food stamp program due to the asset test.

Despite the detailed nature of the Mathematica study, one must wonder about the results. Although it is difficult to evaluate them due to the ommission of certain key figures, it would appear that households in poverty are as much affected by the asset test as households out of poverty. Poverty households headed by younger persons seem to be disqualified as much as poverty households headed by someone over the age of 64. The receipt of asset income by poverty households also appears to have little effect on asset disqualification.

Regardless of its precise accuracy, the Mathematica study does indicate that the asset test cannot be disregarded in determining eligibility for food stamps. In order to acquire some idea of how much the results presented above might be affected by the asset test, we redid the analysis, eliminating all households which in 1976 reported rent, dividend, or interest payments or income from an unincorporated business. In some respects, this restriction is more stringent than that imposed by the food stamp program. In general, up to $1,500 of assets are allowed, and at a 5 percent annual rate of return, a household could receive $75 in asset income and still qualify. More would be allowed to elderly households. Secondly, income-producing real property is not counted among the assets, and this provision may exempt some unincorporated business property and some rental income. However, in other respects, our procedure is not sufficiently stringent to catch all countable assets. Vacation homes and recreational vehicles would be missed, as would checking accounts. Also, holdings of U. S. Savings Bonds might not be counted, as it is possible that households which own such bonds do not report the interest accrued, since it is not received as cash.

Eliminating asset income recipients from the sample reduced the total number of observations by 43. The composition of the poverty population showed little change, the most noticable being a decrease in the percentage of whites. Excluding asset income recipients raised the mean participation rate slightly to 40.8 percent. A comparison of Table 4.7 with Table 4.4 shows that these exclusions made little difference in the participation by the various subgroups, except that the regional differences in participation were stronger when asset income recipients were excluded. Households in the South had significantly higher participation rates than households in other areas of the country.

---

[9] Beebout, et al. (1976).

When we look at the reasons nonparticipants cited for not getting food stamps the belief of ineligibility again dominates. Of the nonparticipants, 59 percent (.349/(1.000-.408)) did not think they were eligible for food stamps in 1976. This is equivalent to the figure for the entire poverty population. However, when the results of the two regressions on reasons for nonparticipation are compared (Tables 4.8 and 4.5), some differences appear. The effect of poor information on explaining the difference in participation rates of elderly unmarried women and middle-aged couples became insignificant (although it is still the largest effect on explaining the difference). Attitudinal reasons became the primary significant variable in explaining the differences in participation between the two groups. Elderly unmarried women were more likely to hold negative attitudes about receiving welfare, and this accounted for 37.6 percent (.092/.245) of the difference in participation rates.

While elderly unmarried males remained significantly more likely to be ill-informed and to suffer from low bonus values, they also became more likely to complain about high purchase prices. This group, unlike any of the others, consistently cited the economic parameters of the program as a reason for nonparticipation. (However, the small number of observations for elderly unmarried males dictates caution in accepting these results.)

Aside from these two cases, the results in Tables 4.5 and 4.8 are roughly comparable. Differences in beliefs about eligibility explain a major portion of the now significant regional differences in participation. Households in both the North Central and Western regions of the country were less well-informed about their eligibility than Southern households. Families living in the North were as well-informed as families in the South, but a combination of more negative attitudes toward receiving welfare and more physical access problems among households in the Northeast resulted in their having significantly lower participation rates.

Table 4.7 (Page 1 of 2)

REGRESSION RESULTS FOR PARTICIPATION IN THE FOOD STAMP PROGRAM IN 1976 AMONG THE POVERTY POPULATION, EXCLUDING ASSET INCOME RECIPIENTS

(N=699, Mean=40.8%)

Demographic and Program Variables (omitted category)	Weighted Percentage of Poverty Population	Whether Used Stamps in 1976
Age Sex Marital Status		
Young couple	1.1%	.537**
(Middle-aged couple)	13.6	-
Elderly couple	7.2	-.052
Young unmarried female	10.5	-.063
Middle-aged unmarried female	29.8	-.111
Elderly unmarried female	23.4	-.245**
Young unmarried male	5.9	-.187*
Middle-aged unmarried male	6.1	-.251**
Elderly unmarried male	2.4	-.416**
Welfare Status		
Received welfare in 1976	27.1	.610**
No welfare in 1976, but received welfare or food stamps in 1975	8.1	.220**
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	36.9	.144*
(No welfare in 1976 or 1975	27.9	-
Employment Status		
(Employed)	25.2	-
Unemployed	9.8	.045
Retired	18.8	.062
Disabled	15.5	.027
Housewife	26.6	.013
Student, other	4.1	-.011
City Size		
(500,000 or More)	32.4	-
100,000 - 499,999	15.7	.033
25,000 - 99,999	17.4	.033
Less than 25,000	34.5	-.171*

Table 4.7 (Page 2 of 2)

Demographic and Program Variables (omitted category)	Weighted Percentage of Poverty Population	Whether Used Stamps in 1976
Distance to Nearest City of 50,000		
(Less than 5 miles)	21.9	-
5 - 14	22.9	.049
15 - 29	9.9	.095
30 - 49	11.1	.079
50 or more	34.2	.153*
Transportation		
(Private transportation only)	26.9	-
Private and public transportation	14.5	-.061
Public transportation only	34.0	-.015
No transportation	24.6	-.030*
Race		
(White)	60.3	-
Black	37.2	-.007
Other	2.5	.212*
Region		
Northeast	18.2	-.105*
North Central	23.4	-.118**
(South)	46.6	-
West	11.8	-.106+
Number of Children, Age 0-17	-	.061*
Monthly Purchase Price	-	-.0007
Monthly Bonus Value	-	-.0014+
R^2		.332

Significance Levels:

**.01 *.05 +.10

Table 4.8 (Page 1 of 3)

REGRESSIONS CONCERNING REASONS FOR NONPARTICIPATION IN THE FOOD STAMP PROGRAM IN 1976 AMONG THE POVERTY POPULATION, EXCLUDING ASSET INCOME RECIPIENTS

(N=699)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Mean	.349	.034	.037	.039	.017	.030	.023	.063
Age Sex Marital Status								
Young couple	-.369*	-.041	-.048	-.055	.000	-.057	-.017	.049
(Middle-aged couple)	-	-	-	-	-	-	-	-
Elderly couple	.168+	-.032	.054	-.107*	-.033	.002	.059+	-.058
Young unmarried female	.146+	-.041	-.005	.023	.001	-.064*	.038	-.035
Middle-aged unmarried female	.088	.003	.019	.026	.002	-.033	.033	-.026
Elderly unmarried female	.136	-.043	-.020	.004	.058*	.031	.092**	-.012
Young unmarried male	.075	-.022	-.008	.006	.001	.091*	-.005	.046
Middle-aged unmarried male	.151	-.023	.101*	-.051	.013	-.030	-.001	.091+
Elderly unmarried male	.255+	.126*	.178**	-.056	-.017	.009	.052	-.130+
Welfare Status								
Received welfare in 1976	-.491**	-.005	-.048+	-.028	-.004	-.053*	-.050*	-.065+
No welfare in 1976, but received welfare or food stamps in 1975	-.258**	.028	-.049	.035	-.008	.040	-.046+	.038
No welfare in 1976 or 1975, but received Social Security or SSI in 1976	-.110+	-.001	.002	-.047	.002	-.046+	-.018	.072*
(No welfare in 1976 or 1975	-	-	-	-	-	-	-	-

Table 4.8 (Page 2 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Employment Status								
(Employed)	-	-	-	-	-	-	-	-
Unemployed	.063	-.004	.027	-.078**	.001	.078**	-.029	-.100**
Retired	-.093	.060+	.003	.041	.035	.023	-.089**	-.041
Disabled	.066	-.022	.019	-.026	-.011	.027	-.034	-.044
Housewife	.043	.063*	-.016	-.052+	-.004	.067**	-.009	-.105**
Student, other	-.095	-.005	.098*	-.074+	.004	.227**	-.034	-.109*
City Size								
(500,000 or More)	-	-	-	-	-	-	-	-
100,000 - 499,999	-.033	.039+	.021	.012	-.034*	.002	-.033+	-.006
25,000 - 99,999	-.162**	.063*	-.002	.075**	-.008	.027	-.031	.002
Less than 25,000	-.024	.059*	.015	.029	-.009	.050+	-.013	.062
Distance to Nearest City of 50,000								
(Less than 5 miles)	-	-	-	-	-	-	-	-
5 - 14	.043	-.016	.023	-.008	-.033*	-.003	-.034+	-.023
15 - 29	.067	-.039	.051+	-.055+	-.025	-.029	-.003	-.063+
30 - 49	.154*	-.084**	-.000	-.070*	.052*	-.041	-.040	-.048
50 or more	.093	-.045	-.008	-.072*	-.041*	-.038	-.012	-.030
Transportation								
(Private transportation only)	-	-	-	-	-	-	-	-
Private and public transportation	.115+	-.0[illegible]4	.035	-.038	-.025	-.029	-.057*	.062
Public transportation only	.013	.018	.045	-.034	-.031+	.046*	-.037+	-.005
No transportation	.009	.021	.070**	-.039+	-.007	.016	-.041*	.001
Race								
(White)	-	-	-	-	-	-	-	-
Black	-.003	.037*	-.001	-.030	.029*	-.010	-.004	-.013
Other	-.128	-.024	-.021	-.043	.013	-.033	-.047	.072

Table 4.8 (Page 3 of 3)

Demographic and Program Variables (omitted category)	Illinformed	Purchase Price Too High	Administrative Hassle; Bonus Value Too Low	Tried, But Refused	Physical Access Problems	Don't Need Them	Attitudinal Reasons	Just Don't Know; Other
Region								
Northeast	-.014	.031	.019	-.016	.033*	-.029	.071**	.011
North Central	.127**	-.015	.022	-.021	-.010	.018	.002	-.003
(South)	-	-	-	-	-	-	-	-
West	.147*	-.006	-.012	-.029	.004	.036	.027	-.060+
Number of Children, Age 0-16	-.007	-.041**	-.016	-.028*	-.010	.013	.004	.022
Monthly Purchase Price	-.0007	.0006+	.0004	.0006	.0002	-.0001	.0000	-.0003
Monthly Bonus Value	.0007	.0006+	.0006+	.0003	.0001	-.0004	-.0002	-.0005
R^2 (Adjusted)	.197	.058	.048	.050	.085	.144	.072	.035

Significance Levels:

**.01 *.05 +.10

Summary of Results

We found that 60 percent of households in poverty in 1976 did not use food stamps. The one factor which stood out as the major reason for this low participation rate was that almost 60 percent of the nonusers did not believe that they were eligible to receive food stamps. No other reason stood out as a bar to participation, except perhaps the difficult to interpret "don't know" response. Purchase price problems, the subject of recent legislative action, were mentioned by 5.3 percent of the nonparticipants, virtually the same percentage who mentioned having been refused certification, no need for stamps, and negative attitudes toward receiving stamps.

An examination of inter-group differences in participation yielded three primary conclusions: (1) Households headed by middle-aged unmarried women, by elderly unmarried persons of both sexes, and by unmarried men of all ages had significantly lower participation rates than households headed by middle-aged married couples. (2) Households which had some connection with the public transfer income system had higher participation rates than households which did not. In particular, households which received either AFDC or general assistance payments in 1976 had substantially higher participation rates than any other group. (3) The probability of participation increased as the number of children in the household increased. The analysis explaining these intergroup differences again pointed to poor information as the primary reason for not getting stamps, with some reservations. There can be little doubt that differences in beliefs about eligibility had the most power in explaining differences in participation among different groups of public transfer income recipients. When asset income was not accounted for, poor information about eligibility was the primary reason for the lower participation rates of households headed by elderly unmarried persons. However, when asset income recipients were eliminated from the sample, the effect of poor information for elderly unmarried women became insignificant (when compared to middle-aged couples). Instead, adverse attitudes toward receiving food stamps became the most powerful significant variable in explaining their lower participation.

Other reasons for nonparticipation affected selected subgroups of the poverty population. Elderly unmarried women were more likely to suffer physical access problems. Elderly unmarried men complained about low bonus values and, when asset income recipients were excluded, they also cited high purchase prices as a reason for nonparticipation. (However, the small sample size for this group requires some caution in applying these results to the population as a whole.)

Middle-aged unmarried men were deterred by the administrative red tape involved in the certification process. Finally, households with more children were less likely to have been officially refused certification and were less likely to cite purchase price problems as a reason for not participating.

These results are not without their shortcomings. In determining eligibility, we have made only a crude adjustment for the asset test, and we have ignored other aspects of eligibility, such as the work registration requirement. We have not accounted for allowable deductions from gross income, and consequently have certainly underestimated bonus value and overestimated purchase price. A more fundamental problem in evaluating these results lies in the structure of the model. The estimation model presented above and the interpretation of the results implicitly assume that if the respondents who did not think they were eligible for food stamps were informed of their eligibility, they would automatically participate in the program. They would not be deterred by high purchase prices, low bonus values, stigma, physical access problems, etc. This is certainly too strong an assumption. Consequently, the figures presented above should be taken as estimates of the maximum impact of poor information on participation.

Despite these shortcomings the overriding conclusion of this study remains that if the government wants to increase participation in the food stamp program among the poverty population, it must devote its energies to informing poor households that they are eligible for food stamps. The Outreach programs conducted in the past, which have been specifically designed to meet this problem, apparently have not been successful. The results also indicate that changes in the parameters of the program--for example, lowering the purchase price or increasing the physical accessibility of receiving food stamps--would have only a marginal impact on increasing aggregate participation, although such reforms might be beneficial to particular subgroups of the poverty population. But these reforms cannot hope to have much impact on participation of poor households until such households realize that they do indeed qualify for food stamps.

References

Beebout, H.; LeMat, H. F.; and Kendall, A. Estimates of Food Stamp Eligibility Including the Impact of the Resources Test and Survey Income Underreporting Factors. Princeton: A Mathematica Policy Research, 1976.

Bickel, Gary; and MacDonald, Maurice. "Participation Rates in the Food Stamp Program: Estimated Levels, by State." Discussion Paper 253-75. Madison, Wisconsin: Institute for Research on Poverty, 1975.

Bryant, Keith. "Theory of the Firm in a Non-Market Environment," *The American Journal of Agricultural Economics*, 1972.

Clarkson, Kenneth. "Welfare Benefits of the Food Stamp Program," *Southern Economic Journal*, July 1976.

Coe, Richard. "Participation in the Food Stamp Program among the Poverty Population." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. V, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1976.

Duncan, Greg. "Paths to Economic Well-Being." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. V. Edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1976.

Food Research and Action Committee. "Guide to the Food Stamp Program." New York: 1976.

Holmer, Martin. "The Sensitivity of Transfer Payments to Changes in Policy." Unpublished manuscript prepared for the Office of Income Security Policy, Department of Health, Education, and Welfare, July 1976.

MacDonald, Maurice. *Food, Stamps, and Income Maintenance*. Institute for Research on Poverty: Poverty Policy Analysis Series. New York: Academic Press, 1977.

Peskin, Janice. "Food Stamps: The Decision Whether to Participate." Unpublished manuscript prepared for the Office of Income Security Policy, Department of Health, Education, and Welfare, undated.

Public Law 95-113. "Food and Agriculture Act of 1977." U. S. Congress, Washington, D. C., 1977.

Seagrave, Charles. "Food Stamps." In *The Cyclical Behavior of Transfer Income Programs: A Case Study of the Current Recession*. Washington, D. C.: U. S. Department of Health, Education, and Welfare, 1975.

U. S. Bureau of Census. *Characteristics of Households Purchasing Food Stamps*. Current Population Reports, Series P-23, No. 61. Washington, D. C.: U. S. Department of Commerce, 1976.

U. S. Department of Agriculture. "Food Stamp Program: Statistical Summary of Operations." Food and Nutrition Service. Washington, D. C.: U. S. Department of Agriculture, September, 1977.

Chapter 5

AN EXAMINATION OF THE DYNAMICS OF FOOD STAMP USE

Richard D. Coe

INTRODUCTION

In July of 1974 food stamps were issued for 13.9 million persons. One year later this figure had risen to 19.2 million persons. Two years after that, in July of 1977, the number of persons for whom food stamps were issued had fallen to 16.3 million.[1] Using aggregate time series data, Holmer (1976) and Seagrave (1975) both analyzed the changing level of food stamp caseloads. They identified three factors primarily responsible for the changes: (1) the increased geographical coverage of the program, in particular the addition of Puerto Rico to the food stamp program; (2) changes in the national unemployment rate; and (3) changes in the average benefits which households received from the program.

At the same time, several studies indicated that the participation rate in the food stamp program among eligible households was surprisingly low--below 50 percent.[2] Using mainly cross-sectional individual data, these studies attempted to identify those characteristics which distinguished participants in the program from eligible nonparticipants. Both Coe (1977) and McDonald (1977) found that households which received AFDC or public assistance income were much more likely to use food stamps than households not receiving such income. They also found that eligible households headed by employed persons were less likely to receive food stamps. MacDonald found nominal bonus value to be a significant predictor of participation, but Coe and Clarkson (1976) did not. Finally, Coe found that the age/sex/marital status of the household head was a strong predictor of participation. Households headed by unmarried elderly persons were less likely than other eligible households to use food stamps, but this was not true for households headed by elderly married couples. Households headed by an unmarried male of any age were also less likely to use food stamps. MacDonald, on the other hand, found that the sex of the household head was an insignificant predictor of participation.

---

[1] All figures were taken from U. S. Department of Agriculture (1974-1977) for the respective months.

[2] Bickel and MacDonald (1975); Coe (1977); and U.S. Bureau of Census (1973).

Chapter 4 of this volume examined the question anew, utilizing more recent data on the issue of nonparticipation among eligible households. In general, the results conformed closely to what Coe found in his earlier work, with the exception that the employment status of the head was not a significant factor. According to their own reports, the primary reason that eligible nonparticipants did not use food stamps was that they did not think they were eligible to participate in the food stamp program.

Combining the results of these various studies into a coherent picture of how some families come to use food stamps and others do not is a difficult task. The result from the aggregate studies which identifies changes in the geographical coverage of the program as a reason for increased caseloads is straightforward, as it implies an increase in the population of eligible households. Similar reasoning supports the finding that changes in the nationwide unemployment rate result in changes in food stamp use. However, the finding that higher benefit levels increase food stamp use receives ambiguous support from the cross-sectional data. Most important, the aggregate studies mask any turnover in the food stamp user population. There is reason to believe that even if aggregate caseload levels remained unchanged over time, there would be mobility onto and off the food stamp rolls. Previous studies in this series of volumes have documented that there is considerable turnover in the poverty population,[3] a fact implying turnover among those eligible for food stamps. Moreover, a study of AFDC caseloads in New York City found substantial mobility onto and off the welfare rolls (Lyon, 1975). Thus it would seem that the aggregate caseload studies provide an incomplete picture of why certain households come to use food stamps and others do not. Unfortunately, cross-sectional studies by their very nature reveal little of the dynamics of food stamp use.

This chapter is aimed at utilizing a third type of data set--a longitudinal microdata set from the Panel Study of Income Dynamics--to examine the factors which determine a household's use of food stamps. The analysis consists of two parts. The first part takes as its sample all households in 1977 in which either the head or the wife (referred to hereafter as the relevant sample person) was a member of a household which did not use food stamps in 1973.[4] The dependent variable of this part of the analysis is whether or not the 1977 household used food stamps in 1976. Thus, we are analyzing why non-users become users over a period of four years, ignoring intervening changes in use status. The second part of the analysis looks at the flip-side of this issue. It takes as its sample all households in 1977 in which the head or the wife was a member of a household which used food stamps in 1973. The dependent variable of this part of the analysis is the same as for the first part--whether or not the 1977 household used food stamps in 1976. Thus, in the second part we are analyzing why users became nonusers over a period of four years. In effect, the approach combines elements of the two types of previous studies mentioned above. We are looking at changes in use over time among all families, not just eligible families, but we are using individual characteristics of the household rather than aggregate data to predict such change.

---

[3] See Lane and Morgan (1975); Coe (1978); and Coe (1976).

The results of this research revealed some interesting aspects of the dynamics of food stamp use. In 1973, 7.1 percent of the relevant sample persons of 1977 households were in households which used food stamps. In 1976, 7.8 percent of the households received food stamps. Behind this slight aggregate increase in participation in the food stamp program there was considerable change in individual households' use of the stamps. Of the 5,132 households which did not use stamps in 1973, 4.6 percent were using food stamps in 1976. Of the 835 households which were using food stamps in 1973, 50.7 percent did not receive stamps in 1976. Over the four-year period between 1973 and 1976, 14.8 percent of the households used food stamps at some time.

We attempted with the use of a path model to identify the factors which are influential in predicting whether a household joins or quits the food stamp program. A household's connection to other parts of the welfare system dominates as a factor in explaining a household's decision to begin or to stop participating in the food stamp program. Initially nonparticipating households which received AFDC or general assistance payments in 1976 had an approximately 50 percent higher probability of joining the food stamp program than household which received no such income. Similarly, for households which used food stamps in 1973, those which received AFDC or general assistance payments in 1976 had markedly lower probabilities--ranging from 28 to 66 percent--of quitting the food stamp program. This reinforces the cross-sectional finding of Chapter 4, in which the reason for this large differential was attributed primarily to the better information which welfare households had concerning their eligibility for food stamps, as well as to their less adverse attitudes toward receiving welfare.

---

[4] This does not necessarily mean that the head or wife of the 1977 household was a head or a wife of the 1973 household. For example, a daughter of a sample person in 1973 might leave the original family and become married by 1977. She would be the relevant sample person of the 1977 household.

We also found the complementary result that the head of the household's connection to the labor force was significant in predicting change in the use of food stamps. Of the original nonparticipating households, virtually all those groups in which the head worked less than 1,500 hours in 1976 had significantly higher probabilities of joining the food stamp program than households in which the head worked at least 1,500 hours. These increased probabilities ranged from 4 to 14 percent. For households which used food stamps in 1976, the effects of labor force status were more mixed. In general, however, households in which the head worked less than 500 hours in 1976 had lower probabilities of quitting the food stamp program. Other variables measuring the household head's labor market experience, such as change in the number of weeks of work missed due to illness and change in wage rate, were often significant in the expected direction in predicting both joining and quitting the food stamp program, although the size of their effects was generally small.

Changes in the composition of the family were also important in predicting change in food stamp use. An increase in the number of children in the household under the age of 18 increased the probability of joining the food stamp program. Having a child under the age of seven in the household both increased the probability of joining the program and decreased the probability of quitting the use of the stamps. The effect of a household being headed by a woman in 1976 also stood out. Regardless of the initial family situation, households headed by women in 1976 had roughly a 5 percent greater probability of joining the food stamp program and a 27 percent lower probability of quitting it. Households headed by females and households with more children, especially younger children, were more likely to receive AFDC or general assistance payments, and this factor accounted for a large fraction of the increased probabilities of the use of food stamps for these groups.

The remainder of this chapter describes these findings in detail. First, there is a brief description of the year-to-year change in food stamp use over the four-year period 1973-1976. The next section lays out the basic model to be estimated, which is the same for both parts of the analysis. This is followed by a discussion of the empirical results, first for the analysis of joining the food stamp program and then for the analysis of quitting the program. The results of the basic model are then briefly summarized.

YEAR-TO-CHANGE IN FOOD STAMP USE

We have n[illegible] that the aggregate studies on food stamp caseloads ignore the possibility that, even with a fixed-caseload total, there may be considerable turnover in the population of food stamp users. Also, as mentioned above, this study ignores changes in food stamp use which occurred within the 1973-1976 time frame. Below we document just how much year-to-year change in food stamp use we are overlooking with this approach.

Table 5.1 shows the distribution of households by all the possible combinations of year-to-year change in food stamp use. Of all 1977 households, 7.1 percent contained a relevant sample person who in 1973 had been a member of a household which received food stamps. In 1976, 7.8 percent of the households received food stamps. However, these aggregate figures hide considerable change over the years. Only 2.8 percent of the 1977 households had a relevant sample person who was in a household which received food stamps during each year of the four-year period, but almost 15 percent of the households received food stamps at some time over the four-year period.

For the purpose of evaluating the results which will be presented in this chapter, it is of interest to know how much change will be missed by comparing use status in the beginning and the end year. The most troublesome patterns of change have been marked in Table 5.1 by a double asterisk. These represent households which show no beginning to end-year change but which had change in the intervening years. One potential problem arises from the fact that our analysis excludes a nontrivial number of households which did not use food stamps in 1973 nor in 1976 but which did use them during either 1974 or 1975 or both. Of all the households, 7.7 percent did not use food stamps in 1973 but did use them in one of the three subsequent years. However, only 4.3 percent of these households used stamps in 1976. Thus we miss approximately 44 percent of the households which joined the food stamp program. The comparable problem is minor for that part of the analysis which examines quitting the food stamp program.

THE ESTIMATION MODEL

A path model of change in the use of food stamps was selected as the estimation model in order to better identify the process by which different variables affected the decision to use stamps. Figure 5.1 illustrates the setup

Table 5.1

DISTRIBUTION OF 1977 HOUSEHOLDS BY FOOD STAMP USE PATTERNS, 1973-1976

Year				Unweighted Number of Observations	Weighted Percentage of Sample	Number of Changes
1973	1974	1975	1976			
Y	Y	Y	Y	360	2.8	0
Y	Y	Y	N	124	1.1	1
**Y	N	Y	Y	33	0.3	2
**Y	Y	N	Y	31	0.2	2
N	Y	Y	Y	104	0.8	1
*Y	N	Y	N	14	0.1	3
*N	Y	N	Y	22	0.2	2
**Y	N	N	Y	24	0.2	2
**N	Y	Y	N	74	0.8	2
Y	Y	N	N	117	1.0	1
N	N	Y	Y	137	1.2	1
N	N	N	Y	184	2.1	1
**N	N	Y	N	136	1.4	2
**N	Y	N	N	117	1.2	2
Y	N	N	N	135	1.4	1
N	N	N	N	4,395	85.2	0
			TOTALS	6,007	100.0	

CODE: Y = Household Received Food Stamps
in Designated Year

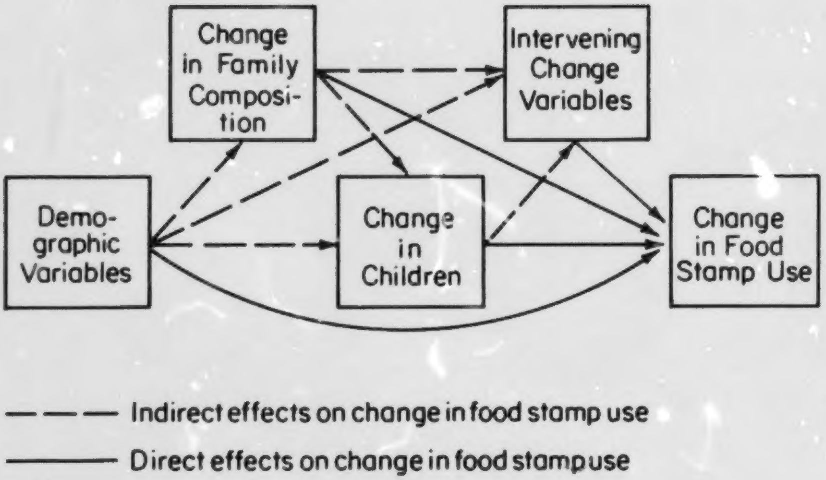
N = Household Did Not Receive Food
Stamps in Designated Year

**Change in use status which the subsequent analysis ignores completely.

*Change in use status which the subsequent analysis partially ignores.

FIGURE 5.1

A PATH MODEL OF CHANGE IN THE USE OF FOOD STAMPS


Change in Family Composition
Intervening Change Variables
Demographic Variables
Change in Children
Change in Food Stamp Use
– – – Indirect effects on change in food stamp use
——— Direct effects on change in food stamp use

of the model, while Figure 5.2 specifies the variables which were entered at each step of the model. A detailed description of the variables is given in the appendix to this chapter.

The model has five stages. The first stage controls for a limited number of demographic characteristics of the household. The second level accounts for changes in the head of the 1976 household from the initial year (1973). No other account is taken of changes which occur within the period. Thus, if a household was headed in 1973 by a married couple who divorced in 1974 and both husband and wife remarried in 1975, we would count two 1976 households--each headed by a married couple in both years.[5]

The third level of this path model focuses on changes in the children in the household. It looks at both changes in the number of children under the age of 18 and whether or not there were children under the age of seven in the household. The fourth level of the model introduces a number of change variables which were thought to influence the decision to use food stamps. These focus primarily on the household's work and welfare experiences but also look at disability, rent, and rural-urban mobility. The fifth level of the model is the ultimate dependent variable of the analysis, a 0-1 dichotomous variable. For the analysis of joining the food stamp program, this variable was coded 1 if the household received food stamps in 1976. For the analysis of quitting the food stamp program, the dependent variable was coded 1 if the household did not receive food stamps in 1976.

Certain aspects of this model should be noted. The causal chain is assumed to run from left to right in Figure 5.1. Thus, family composition change may affect change in children, but not vice versa. Furthermore, simultaneity problems within a particular level are ignored. This would be most troublesome with respect to the work-welfare trade-off.

As always, changes in the composition of the family complicate the analysis. Death, divorce, and children leaving home result in radically different responsibilities and relationships for the relevant sample person. Many of the intervening variables concern changes in the household head's work and welfare status. It is likely that the effects of these variables would be different for same-headed households than for households which had a change in head. To test this, interaction terms between same head and the intervening change variables

---

[5] The 1976 household which contained the wife from the 1973 household would have a different head from the 1973 household. However, it would still be classified in the "Same Head" category.

Figure 5.2

VARIABLES ENTERED IN PATH MODEL FOR CHANGE IN THE USE OF FOOD STAMPS, 1973-1976

Demographic Variables	Family Composition Change, 1973-1976	Change in Children	Intervening Change Variables	Change in Food Stamp Use
Whether Black Age of Head of 1976 Household Education of Head of 1976 Household Number of Children Age 0-17 in 1973 Household	Same Head Married Couple in both 1973 and 1976 Married in 1973 Unmarried Male Head Age in 1976 Unmarried Male Head in 1973, Married in 1976 Unmarried Male Head in 1973 and 1976 Unmarried Female Head in 1973 and 1976 Different Head Splitoff, Married Couple in 1976 Married in 1973, Unmarried Female Head in 1976 Unmarried Female Head in 1973, Married in 1976 Splitoff, Unmarried Male Head in 1976 Splitoff, Unmarried Female Head in 1976	Change in Number of Children Age 0-17 Change in Whether Children Age 0-6	Change in Head's Illness weeks Change in Head's Unemployment and Strike Weeks Change in Wife's Work Weeks Change in Head's Wage Rate Change in Rent Change in Head's Disability Change in City Size Change in AFDC Status Change in Head's Employment Status	Whether Used Food Stamps in 1976

NOTE: A detailed description of these variables is given in the appendix to this chapter.

were introduced into the fourth stage of the model. Several were significant, indicating that these different effects had to be controlled for. The most convenient method to accomplish this was to divide the sample into two groups--1976 households[6] with the same head as in 1973[7] and 1976 households with a different head than in 1973. The analysis was then run for these two groups separately.

The mathematical representation of the model is given in the appendix to this chapter and includes a derivation of the indirect effects discussed in the results.

THE RESULTS FOR JOINING THE FOOD STAMP PROGRAM[8]

We begin by examining the effects of the intervening change variables on joining the food stamp program. We then work backwards through the different stages of the model, looking first at the total, direct, and indirect effects of change in children and in family composition, and finally we take a brief look at the effects of the demographic variables.

Before we begin, a description of the sample is in order. Overall, there were 5,132 households[9] in 1976 in which the relevant sample person was in a household in 1973 which did not use food stamps. For 4,050 of these families there was no change in family head from 1973 to 1976, while 1,282 households did have such a change. Of the "same head" group, 4.3 percent used food stamps in 1976, while 7.6 percent of the "different head" group used the stamps. Among the entire sample, 4.6 percent of the households used food stamps in 1976.

---

[6] We use the term "1976 households" to refer to respondents of the Spring 1977 interview, which covers the income and welfare situation of the household in 1976.

[7] As indicated in Footnote 3, the subsample labelled "Same Head" contains some households with different heads. This group would consist of relevant sample persons who were wives in 1973 and were still wives in 1976 but with new spouses. Because the marital relationship of the relevant sample persons was the same as in 1973 (i.e., wives), this group was aligned with other households in the "Same Head" category, and thus was included in this group. The relative numbers of this group should not be large. Previous findings from this series of volumes showed that 2,417 women who were married in 1968, only 64 had been divorced or widowed and remarried by 1974, while 2,026 had remained married to the same man throughout (Hoffman and Holmes, 1976). However, those women who had divorced and remarried enjoyed substantially higher increases, on average, in real income than those who had remained married. Thus the possibility remains that combining these two groups masks some significant differences between them.

[8] The complete set of regression results is given in the appendix to this chapter.

[9] In Table 5.2, there were 5,169 households in 1976 in which the relevant sample person was in a household in 1973 which did not use food stamps. The 37 cases which were eliminated from the sample had missing data on at least one of the variables used in the analysis.

Intervening Change Variables

Table 5.2 presents the results on joining the food stamp program when all the independent variables are entered into the equation. Consequently, the results shown represent the direct effect of all the variables on joining the food stamp program. We will look first at the intervening change variables.

Change in AFDC status and in employment status exerted the strongest influence on joining the food stamp program. The effects were very similar for both groups of the sample. The effects of receiving AFDC were the most dramatic. Households which were receiving AFDC in 1976 had more than a 50 percent greater probability of joining the food stamp program than households which never received any AFDC. Among households with no change in head, those which received no AFDC in 1976 but did receive it in 1973 also had a significantly greater likelihood of joining the program, although the effect was not nearly so great (5.5 percent). These results parallel the findings of Chapter 4 that a household's association with the welfare system resulted in higher food stamp participation rates. The reason given for this effect was the better information about eligibility possessed by families in contact with the welfare system, and also less adverse attitudes toward receiving food stamps. It is also probable that families which have dealt with the welfare system are better able to cope with the bureaucracy.

The effect of not working full-time on the probability of joining the food stamp program was also significant and substantial. All households in which the head was not working full-time in 1976 had a significantly higher probability of joining the food stamp program than households in which the head was working more than 1,500 hours in both 1973 and 1976--with the unusual exception of those households in which the head went from working part-time in 1973 to less than 500 hours in 1976. Households in which the head went from no work or part-time work to full-time work did not differ significantly from households where the head always worked full-time. The size of the effect differed somewhat between the two subsamples and between the various change groups. For both the same-headed and different-headed subsamples of households those in which the head went from full-time to part-time work had an increased probability of slightly more than 8

Table 5.2 (page 1 of 3)

DIRECT EFFECTS FOR JOINING THE FOOD STAMP PROGRAM, FOR SAME AND DIFFERENT HOUSEHOLD HEADS

Independent Variable (Omitted Category)	Same Head		Different Head	
	Weighted Percentage of Population (Mean) N=4050	Regression Coefficient Mean= .040	Weighted Percentage of Population (Mean) N=1082	Regression Coefficient Mean=.076
Constant	-	.132	-	.070
Background Variables				
Whether Black	8.9	.015	11.5	.060**
Age of 1976 head	(44.8)	-.0017**	(28.3)	-.0014*
Education of 1976 head	(11.8)	-.0053**	(12.4)	-.0026
Number of children age 0-17 in 1973	(1.08)	.011**	(1.49)	.020*
Family Composition Change				
Same Head				
(Married couple in 1973 and 1976)	67.8	-		
Divorced, widowed male	2.8	-.007		
Unmarried male became married	1.9	-.005		
Unmarried male head in 1973 and 1976	7.0	-.003		
Unmarried female head in 1973 and 1976	20.5	.027*		
Different Head				
(Splitoff, married couple in 1976)			31.5	-
Divorced, widowed female			26.6	-.043+
Unmarried female became married			8.4	.017
Splitoff, unmarried male head in 1976			16.1	-.063**
Splitoff, unmarried female head in 1976			17.5	-.044*
Change in Children				
Change in number of children age 0-17	(-.12)	.023**	(-.98)	.013
(No children age 6 or younger in 1973 and 1976)	71.2	-	70.0	-
Lost children age 0-6	8.3	-.009	9.2	.003
Gained children age 0-6	4.4	-.049**	12.7	.029
Had children age 0-6 in both 1973 and 1976	16.1	.007	8.1	-.016

Table 5.2 (page 2 of 3)

Independent Variable (Omitted Category)	Same Head: Weighted Percentage of Population (Mean) N=4050	Same Head: Regression Coefficient Mean=.040	Different Head: Weighted Percentage of Population (Mean) N=1082	Different Head: Regression Coefficient Mean=.076
Intervening Change Variables				
Change in head's illness weeks	(.06)	.0013+	(.19)	.002
Change in head's unemployment, strike weeks	(.55)	.0019**	(1.48)	-.0008
Change in wife's work weeks	(-.56)	-.0002	(-3.76)	-.0006
Change in rent ($10)	(.25)	.0011*	(5.48)	.0005
Change in head's wage	(-.44)	-.0010+	(-.79)	-.0036*
(Head never disabled)	88.5	-	87.1	-
Head became able	3.4	.016	6.8	-.024
Head became disabled	5.0	.010	4.2	.031
Head always disabled	3.1	.031+	1.9	-.061
(Always urban)	65.5	-	65.5	-
Urban to rural	2.1	.004	5.1	.033
Rural to urban	2.2	.011	5.6	-.003
Always rural	30.2	-.011+	23.8	.004

Table 5.2 (page 3 of 3)

Independent Variable (Omitted Category)	Same Head: Weighted Percentage of Population (Mean) N=4050	Same Head: Regression Coefficient Mean= .040	Different Head: Weighted Percentage of Population (Mean) N=1082	Different Head: Regression Coefficient Mean=.076
(Did not receive AFDC in either 1973 or 1976)	96.5	-	91.9	-
No AFDC in 1973, but received AFDC in 1976	1.7	.512**	5.3	.617**
Received AFDC in 1973, but no AFDC in 1976	1.4	.055*	1.8	-.000
Received AFDC in both 1973 and 1976	0.4	.526**	1.0	.495**
(Head employed full time in both 1973 and 1976)	60.8	-	50.8	-
Full-time to part-time	6.8	.084**	11.6	.082**
Full-time to not working	5.5	.054**	8.3	.125
Part-time to full-time	2.7	.004	7.4	-.022
Always part-time	2.9	.090**	3.5	.131**
Part-time to not working	3.2	.026	[illegible]	-.005
Not working to full-time	0.9	-.021	4.6	.040
Not working to part-time	1.1	.055*	1.5	.143**
Head not working in both 1973 and 1976	16.1	.041**	10.1	.068*
R2 (Adjusted)		.244		.424

Significance Levels:

**.01 *.05 +.10

percent of using food stamps in 1976. For the different-headed subsample, this figure contrasted to increased probabilities of more than 12 percent for the groups that went from full-time to not working, were always part-time, or went from not working to part-time work. The corresponding results for the same-headed subsample were all lower. For both subsamples, households in which the head did not work in 1973 nor in 1976 had the smallest significant increased probability of using food stamps--4.1 percent for same-headed households and 6.8 percent for different-headed households.

The other change variables relating to work generally had the expected sign and were often significant (especially for same-headed households), but their effects were small. The disability variables and the urban-rural migration variables were generally insignificant.

Change in Children

The first column of Table 5.3 shows the total effect on joining the food stamp program of the "change in children" variables. The remaining columns divide this total effect into the direct effect, which operates independently of the intervening change variables, and the indirect effects, which operate through the intervening change variables. For the indirect effects, we have limited ourselves to looking only at the effects which operate through variables that were significant at the 10 percent level. For example, the fact that there is an entry in the first row under "change in head's illness weeks" means both that change in the number of children age 0-17 is a significant predictor (at the 10 percent level) of change in head's illness weeks and that change in head's illness weeks is a significant predictor of joining the food stamp program for same-headed households, as we saw in Table 5.1.[10]

Looking first at the results for different-headed households, the total effect of all of the variables have the expected sign, and three are significant. The probability of joining the food stamp program increases 2.5 percentage points for each child under the age of 18 added to the household between 1973 and 1976. Households which gained at least one child under the age of seven had an 8.1 percent greater chance[11] of using food stamps than households

---

[10] Those intervening variables for which there were no significant indirect effects have been eliminated from the tables.

[11] Actually, the effect of gaining one child under the age of seven works both through the dummy variable "gained children, age 0-6" and through the continuous variable "change in number of children, age 0-17." Thus, the addition of a child under the age of seven, ceteris paribus, would increase the

Table 5.3 (page 1 of 2)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF CHANGE IN CHILDREN VARIABLES ON JOINING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:						
Change in Children	Total Effect	Direct Effect	Change in Head's Illness Weeks	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Head's Wage	Whether Head Always Disabled	Whether Always Disabled	Whether Became AFDC Recipient
Same Head									
Change in number of children, age 0-17	.025**	.023**	.0003	-.0008	-	-	-	-	.0046
(Never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	-.008	-.009	-	-	-	-	.007	-.0006	-
Gained children, age 0-6	-.024	-.049**	-	.0037	-	.0011	-	-.0009	.0143
Always had children, age 0-6	.010	.007	-	-	-	-.0007	-	-.0011	-
Different Head									
Change in number of children, age 0-17	.025*	.013	-	-	-	.0016	-	-	.014
(never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	- .030	.003	-	-	-	-	-	-	-
Gained children, age 0-6	.081**	.029	-	-	.0080	-.0047	-	-	.049
Always had children, age 0-6	.077**	-.016	-	-	-	-.0092	-	-	.051

Table 5.3 (Page 2 of 2)

Family Composition Change	Whether Always AFDC Recipient	Whether Full Time to Part Time Work	Whether Full Time Work to No Work	Whether Always Part Time	Whether No Work to Part Time Work	Whether Always No Work
	Indirect Effect Operating Through:					
Same head						
Change in number of children, age 0-17	-	-.0012	-	-	.0003	-
(Never had children, age 0-6)	-	-	-	-	-	-
Lost children, age 0-6	-	-0036	-	-	-	.0036
Gained children, age 0-6	-	-	-	-		.0040
Always had children, age 0-6	-	-.0038	-	-	-.0006	.0049
Different Head						
Change in number of children age 0-17	-	-	.0041	.0017	-	-.0031
(Never had children, age 0-6)	-	-	-	-	-	-
Lost children, age 0-6	-	-	-.0[illegible]3	-	-	-.0029
Gained children, age 0-6	-	.011	-.0093	-.0058	-	.0035
Always had children, age 0-6	.047	-	-	-.0052	.0060	.0071

which did not have a young child in either 1973 or 1976, and households which had a young child in both years had a 7.7 percent greater probability of joining the food stamp program.

Why do these variables have a significant effect on using food stamps? Their direct effects are all insignificant, and considerably smaller than the total effects, indicating that the primary influence operates through the intervening change variables. An examination of Table 5.3 reveals that the change in AFDC status variables accounts for virtually all of the effects of the change in children variables for different-headed households. For example, of the 8.1 percent increased probability of joining the food stamp program for households which gained at least one child under the age of seven, 4.9 percent resulted from the fact that such households were significantly more likely to become AFDC recipients. The relative magnitude of the effect of becoming recipients of AFDC was similar for those households which always had a child under the age of seven and for those households which had an increase in the number of children under the age of eighteen. In addition, households which had a young child in both years were more likely to be welfare recipients in both years, and this factor increased the probability of using food stamps in 1976 by 4.7 percent. For different-headed households, the only other indirect effect which affected the probability of joining the food stamp program by more than one percent was that households which gained a young child were more likely to have the new head work only part-time while the original head was a full-time worker. This factor increased the probability of using food stamps in 1976 by 1.1 percent.

For households with the same head in 1973 and 1976, the results did not as neatly match expectations. A change in the number of children under the age of 18 had the same total effect on the probability of joining the food stamp program as it did for households with different heads. A net increase in the number of children increased the probability of joining the food stamp program by 2.5 percentage points. However, in contrast to different-headed households, the effect of this variable operates almost totally independently of the intervening change variables, as evidenced by a direct effect of 2.3 percentage points. Thus, we are unable to quantify the process by which a change in the number of children for same-headed households affects the probability of using food stamps.

---

probability of joining the food stamp program by 10.6 percent (8.1 + 2.5).

Table 5.3 (page 1 of 2)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF CHANGE IN CHILDREN VARIABLES ON JOINING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:						
Change in Children	Total Effect	Direct Effect	Change in Head's Illness Weeks	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Head's Wage	Whether Head Always Disabled	Whether Always Disabled	Whether Became AFDC Recipient
Same Head									
Change in number of children, age 0-17	.025**	.023**	.0003	-.0008	-	-	-	-	.0046
(Never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	-.008	-.009	-	-	-	-	.007	-.0006	-
Gained children, age 0-6	-.024	-.049**	-	.0037	-	.0011	-	-.0009	.0143
Always had children, age 0-6	.010	.007	-	-	-	-.0007	-	-.0011	-
Different Head									
Change in number of children, age 0-17	.025*	.013	-	-	-	.0016	-	-	.014
(never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	- .030	.003	-	-	-	-	-	-	-
Gained children, age 0-6	.081**	.029	-	-	.0080	-.0047	-	-	.049
Always had children, age 0-6	.077**	-.016	-	-	-	-.0092	-	-	.051

Table 5.3 (Page 2 of 2)

	Indirect Effect Operating Through:					
Family Composition Change	Whether Always AFDC Recipient	Whether Full Time to Part Time Work	Whether Full Time Work to No Work	Whether Always Part Time	Whether No Work to Part Time Work	Whether Always No Work
Same head						
Change in number of children, age 0-17	-	-.0012	-	-	.0003	-
(Never had children, age 0-6)	-	-	-	-	-	-
Lost children, age 0-6	-	-0036	-	-	-	.0036
Gained children, age 0-6	-	-	-	-		.0040
Always had children, age 0-6	-	-.0038	-	-	-.0006	.0049
Different Head						
Change in number of children age 0-17	-	-	.0041	.0017	-	-.0031
(Never had children, age 0-6)	-	-	-	-	-	-
Lost children, age 0-6	-	-	-.0073	-	-	-.0029
Gained children, age 0-6	-	.011	-.0093	-.0058	-	.0035
Always had children, age 0-6	.047	-	-	-.0052	.0060	.0071

The variables comparing different situations regarding children under the age of seven for households with the same head were insignificant in predicting food stamp use, with the anomalous result that the direct effect of gaining at least one young child was highly significant in the negative direction. The total effect of this variable was insignificantly negative; the significantly negative direct effect resulted primarily from the fact that, as expected, gaining a young child was a significant predictor of becoming an AFDC recipient. Because becoming an AFDC recipient had a strong positive effect on using food stamps, the combination resulted in the gain of a young child exerting a positive indirect effect on joining the food stamp program. Partialling this effect out left a strong negative direct effect for gaining a young child. Thus, although we see some similarity in the effect of gaining a young child for same and different-headed households--that such an event leads to a higher probability of becoming an AFDC recipient which in turn leads to a higher probability of joining the food stamp program--we have not been able to identify why gaining a young child leads to such a dramatically different overall effect for the two subsamples.

Change in Family Composition

The total, direct, and indirect effects of family composition change on joining the food stamp program are presented in Table 5.4. The first two columns show the effect of different family composition changes when the two subsamples are analyzed separately, and the results for the entire sample are shown in parentheses in order to compare across all types of family composition change. Although the sizes of the coefficients sometimes differ, the two sets of results display a similar pattern. Looking at the total effects, the impact of being an unmarried female household head in 1976 clearly stands out. The unmarried women who headed households in 1976, regardless of their marital or family status in 1973, had a significantly higher probability (roughly 5 percent higher) than married couples of using food stamps in 1976. Surprisingly, unmarried female heads in 1973 who were married by 1976 also had a higher probability than splitoff married couples and couples married in both 1973 and 1976, although this result was significant at only the 10 percent level. As might be expected, men who left home and remained unmarried had a significantly lower probability of joining the food stamp program.

An examination of the indirect effects of family composition change reveals that AFDC status was again a major reason for the differences in these groups.

Table 5.4 (page 1 of 4)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF FAMILY COMPOSITION CHANGE ON JOINING THE FOOD STAMP PROGRAM

Family Composition Change	Total Effect	Direct Effect	Indirect Effect Operating Through: Change in Number of Children, 0-17	Indirect Effect Operating Through: Whether Gained Children, Age 0-6
Same Head (Married couple in 1973 and 1976)	-	-	-	-
Divorced, widowed male	-.019	-.007	-.016	.003
Unmarried male became married	.018	-.005	.007	-.007
Unmarried male head in 1973 and 1976	.009	-.003	-.007	.004
Unmarried female head in 1973 and 1976	.053**	.027**	-.003	.002
Different Head (Splitoff, married in 1976)	- (.005)[a]	- (.010)	-	-
Divorced, widowed female	.057* (.034*)	-.043+ (.048*)	-	-
Unmarried female became married	.060+ (.046+)	.017 (.013)	-	-
Splitoff, unmarried male in 1976	-.059** (.048**)	-.063** (-.072**)	-	-
Splitoff, unmarried female in 1976	.052* (.058**)	-.044* (-.053*)	-	-

[a] The coefficients in parentheses are differences from the omitted group, "married couple in 1973 and 1976," obtained when the analysis was run on the entire sample.

Table 5.4 (page 2 of 4)

Family Composition Change	Indirect Effect Operating Through: Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage Rate	Whether Head Always Dis-abled
Same Head (Married couple in 1973 and 1976)	-	-	-	-
Divorced, widowed male	-	-	-.0008	-
unmarried male became married	-	.040	-.0011	-
Unmarried male head in 1973 and 1976	-	.020	-.0009	.0009
Unmarried female head in 1973 and 1976	-	.011	-.0009	-
Different Head (Splitoff, married in 1976)	-	-	-	-
Divorced, widowed female	.015	-	-	-
Unmarried female became married	-	-	-.012	-
Splitoff, unmarried male in 1976	.011	-	-.003	-
Splitoff, unmarried female in 1976	.011	-	.002	-

Table 5.4 (page 3 of 4)

Family Composition Change	Indirect Effect Operating Through:					
	Whether Always Rural	Whether Became AFDC Recipient	Whether Quit AFDC	Whether Always AFDC Recipient	Whether Full-time to Part-time Work	Whether Fulll-time time Work to No Work
Same Head (Married couple in 1973 and 1976)	-	-	-	-	-	-
Divorced, widowed male	-	-	-	-	-	-
Unmarried male became married	.001	-	-	-	-	-
Unmarried male head in 1973 and 1976	-	-	.002	-	-	-
Unmarried female head in 1973 and 1976	.0006	.011	.002	.008	-	-.002
Different Head (Splitoff, married in 1976)	-	-	-	-	-	-
Divorced, widowed female	-	.056	-	-	.008	.015
Unmarried female became married	-	.028	-	-	.007	-
Splitoff, unmarried male in 1976	-	.025	-	-	.006	-
Splitoff, unmarried female in 1976	-	.065	-	.008	.013	.011

Table 5.4 (page 4 of 4)

Family Composition Change	Indirect Effect Operating Through:		
	Whether Always Part time	Whether No Work to Part-time Work	Whether Always No Work
Same Head (Married couple in 1973 and 1976)			
Divorced, widowed male	-	-	.005
Unmarried male became married	-	-	.004
Unmarried male head in 1973 and 1976	-	-	.007
Unmarried female head in 1973 and 1976	.003	.001	.006
Different Head (Splitoff, married in 1976)	-	-	-
Divorced, widowed female	-	-	-
Unmarried female became married	-	-	-.006
Splitoff, unmarried male in 1976	-	-	.004
Splitoff, unmarried female in 1976	-	-	.002

Signigicance Levels:

**.01 *.05 +.10

Both divorced or widowed women and splitoff women were significantly more likely to become AFDC recipients, and this increased the probability of their using food stamps by 5.6 and 6.5 percentage points, respectively. Their change in family situation also adversely affected their labor market position, as they were more likely to leave households headed by full-time workers to form a household in which they, the current heads, worked less than full-time. This factor increased the probability of these groups using food stamps by over two percentage points (as compared to splitoff married couples). Finally, the effect on these two groups of creating a new household with fewer members attached to the labor force showed up in the "change in wife's work weeks" variable, which added slightly over one percentage point to the probability of joining the food stamp program. For divorced or widowed women, this effect is a reflection of the fact that their labor earnings became the sole labor income of the household, rather than an added component to their husbands' income. For splitoff women, this factor indicates that they often left families where the wife worked, and the loss of that additional labor income contributed to the current need for food stamps. (It might be noted that this factor had a similar effect on splitoff men, but other effects more than offset it.)

Women who were unmarried heads of households in both 1973 and 1976 were also significantly more likely than married couples to join the food stamp program. Again, we see that the receipt of AFDC was the primary indirect effect accounting for this increased probability. Receiving AFDC in 1976, regardless of whether the household received it in 1973 or not, added 1.9 percentage points to the probability of using stamps in 1976 among unmarried women as compared to couples who were married in both years. The only other indirect effect which added more than a percentage point to the probability of participation by this group was an increase in rent. This variable was added to the model because the rent paid by a household is a major determinant of eligibility or benefit level in many welfare programs, including food stamps. Apparently, increases in rent induced unmarried female heads to join the food stamp program in 1976.

As mentioned earlier, splitoff unmarried men had a significantly lower probability of joining the food stamp program. However, none of the intervening change variables employed in this model aided in explaining why this occurred.

Demographic Variables

We will briefly discuss the results for the demographic variables, as shown in Table 5.5. For households with the same head in both 1973 and 1976, the older

Table 5.5 (page 1 of 5)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF DEMOGRAPHIC VARIABLES ON JOINING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:							
Demographic Variable	Total Effect	Direct Effect	Whether Divorced, Widowed Male	Whether Unmarried Male Became Married	Whether Unmarried Male Head in 1973 and 1976	Whether Unmarried Female Head in 1973 and 1976	Whether Divorced Widowed Female	Whether Unmarried Female Became Married	Whether Splitoff, Unmarried Male In 1976	Splitoff Unmarried Female In 1976
Same Head										
Whether black	.056**	.015	-	-	-	.004				
1976 head age	-.0015**	-.0017**	-	-	-	.0001				
Education of 1976 head	-.0084**	-.0053**	-	-	-	-				
Number of children Age 0-17 in 1973	.0046*	.011**	-	-	-	-.0011				
Different Head										
Whether black	.099**	.060**					-	-	-.006	-.003
Age of 1976 head	-.0024**	-.0014**					-.0007	-	.0003	.0002
Education of 1976 head	-.151**	-.0026					.0007	-	-	-
Number of children age 0-17 in 1973	.012**	.020					-	-	-	-

Table 5.5 (page 2 of 5)

Demographic Variable	Indirect Effect Operating Through: Whether Number of Children Age 0-17	Indirect Effect Operating Through: Whether Gained Children, Age 0-6
Same Head		
Whether black	-	-.002
Age of 1976 head	-.0003	.0002
Education of 1976 head	-	.0001
Number of children age 0-17 in 1973	-.0070	.0014
Different Head		
Whether black	-	-
Age of 1976 head	-	-
Education of 1976 head	-	-
Number of children age 0-17 in 1973	-	-

Table 5.5 (page 3 of 5)

Demographic Variable	Indirect Effect Operating Through:				
	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage	Whether Head Always Disabled
Same Head					
Whether black	-.0025	-	.0009	-	.0009
Age of 1976 head	-.0001	-	.0000	-	.0000
Education of 1976 head	-.0003	-	-	-	-.0001
Number of children age 0-17 in 1973	-	-	-	-	-.0002
Different Head					
Whether black	-	-	-	-	-
Age of 1976 head	-	-.0001	-	-.0001	-
Education of 1976 head	-	-	-	-.0008	-
Number of children age 0-17 in 1973	-	-.0015	-	.0017	-

Table 5.5 (page 4 of 5)

Demographic Variable	Indirect Effect Operating Through: Whether Always Rural	Whether Became AFDC Recipient	Whether Quit AFDC	Whether Always AFDC Recipient	Whether Full-Time to Part-Time Work	Whether Full-time Work to No Work
Same Head						
Whether black	..001	.018	.002	.010	-	-
Age of 1976 head	-.0000	-.0003	-	.0002	-	-
Education of 1976 head	.0003	-.0017	-.0001	-.0003	-.0002	-.0002
Number of children age 0-17 in 1973	-	.0034	-	.0026	-	-.0006
Different Head						
Whether black	-	-	-	-	-.005	-
Age of 1976 head	-	-.0010	-	.0003	-	-
Education of 1976 head	-	-.0035	-	-.0027	-	-
Number of children age 0-17 in 1973	-	.0179	-	-	-	-.0039

Table 5.5 (page 5 of 5)

Demographic Variable	Indirect Effect Operating Through: Whether Always Part-time	Whether No Work to Part-time Work	Whether Always No Work
Same Head			
Whether black	.002	.001	-
Age of 1976 head	-	-	.0205
Education of 1976 head	.0003	-	-.0005
Number of children age 0-17 in 1973	-.0008	-	-.0008
Different Head			
Whether black	-	-	.003
Age of 1976 head	-	-	.0009
Education of 1976 head	-	-	.0011
Number of children age 0-17 in 1973	-	-	-.0031

Significance Levels:

**.01 *.05 +.10

and the more educated the head was, the lower the probability of joining the food stamp program. The effect of age was almost entirely a direct effect, indicating that the factors which led older households not to use food stamps operated independently of the other variables in model. The effect of increased education was also primarily direct, with the major indirect effect being that less education resulted in a greater likelihood of becoming an AFDC recipient. Blacks were more likely to join the food stamp program, primarily because they were more likely to have received AFDC in 1976.

For different-headed households, the results were very similar. Joining the food stamp program was a decreasing function of age and education. The age effect was mostly direct, while the education effect operated mainly through the AFDC variable. Blacks again were more likely to join the program but, unlike the results for same-headed households, the direct effect dominated here.

RESULTS FOR QUITTING THE FOOD STAMP PROGRAM[12]

There were 835 households[13] in 1976 in which the relevant sample person was in a household in 1973 which received food stamps. Of the households which were headed by the same persons as in 1973 (641), 49.2 percent had stopped using food stamps in 1976. Of the 194 households with a different head in 1976, 56.0 percent had quit the food stamp program in 1976.

Intervening Change Variables

The direct effects of all the variables on quitting the food stamp program are shown in Table 5.6. Focusing our attention on the intervening change variables, we see that as in the case of the results for joining the program the AFDC status variables dominate. For all households, the receipt of AFDC payments in 1976 had a strong negative effect on quitting the food stamp program. The effect was stronger for different-headed households and was also stronger for those households which did not receive AFDC in 1973. For example, same-headed households which received AFDC in both 1973 and 1976 had a 27.7 percent lower probability of quitting the program. Same-headed households which received AFDC in 1976 but not in 1973 had a 40.6 percent lower probability. The corresponding

---

[12] The complete set of regression results is given in the appendix to this chapter.

[13] In Table 5.1, there were 838 households in 1976 in which the relevant sample person was in a household in 1973 which used food stamps. Three cases were eliminated due to missing data.

Table 5.6 (page 1 of 3)

DIRECT EFFECTS FOR QUITTING THE FOOD STAMP PROGRAM, IN HOUSEHOLDS WITH SAME AND DIFFERENT HEADS

	Same Head		Different Head	
Independent Variable (Omitted Category)	Weighted Percent of Population (Mean) N=641	Regression Coefficient Mean= .492	Weighted Percent of Population (Mean) (N=194	Regression Coefficient Mean=.560
Constant	-	.771	-	1.211
Background Variables				
Whether black	.393	-.026	.408	.096
Age of 1976 head	(42.0)	.0002	(33.5)	-.0062+
Education of 1976 head	(9.2)	.0091	(9.9)	-.0072
Number of children age 0-17 in 1973	(2.1)	-.0262*	(2.3)	.0061
Family Composition Change				
Same Head				
(Married couple in 1973 and 1976)	.406	-		
Divorced, widowed male	.039	-.026		
Unmarried male became married	.012	-.849*		
Unmarried male head in 1973 and 1976	.046	.156+		
Unmarried female head in 1973 and 1976	.497	-.099**		
Different Head				
(Splitoff, married couple in 1976)			.130	-
Divorced, widowed female			.404	-.004
Unmarried female became married			.113	.059
Splitoff, unmarried male in 1976			.141	-.107
Splitoff, unmarried female in 1976			.211	-.141
Change in Children				
Change in number of children	(-.291)	-.023	(-1.111)	-.014
(No children age 6 or less in 1973 and 1976)	.527	-	.448	-
Lost children age 0-6	.096	-.021	.125	-.080
Gained children age 0-6	.072	-.076	.143	-.101
Had children age 0-6 in both 1973 and 1976	.305	-.055	.284	.020

Table 5.6 (page 2 of 3)

	Same Head		Different Head	
Independent Variable (Omitted Category)	Weighted Percent of Population (Mean) N=641	Regression Coefficient Mean= .492	Weighted Percent of Population (Mean)	Regression Coefficient Mean=.560
Intervening Change Variables				
Change in head's illness weeks	(-.480)	-.0054*	(-.702)	-.0063
Change in head's unemployment strike weeks	(-2.576)	.0006	(-2.195)	-.0019
Change in wife's work weeks	(.782)	.0008	(-2.443)	.0002
Change in rent ($10)	(1.653)	-.0015	(4.040)	-.0012
Change in heads wage	(-.014)	-.0058	(.580)	.0541**
(Head never disabled)	.647	-	.589	-
Head became able	.153	-.109*	.292	.013
Head became disabled	.092	.039	.057	.264
Head always disabled	.38	.095	.062	-.301+
(Always urban)	.716	-	.664	-
Urban to rural	.017	-.173	.058	.096
Rural to urban	.021	-.032	.013	-.023
Always rural	.246	-.092*	.265	-.158+

Table 5.6 (page 3 of 3)

	Same Head		Different Head	
Independent Variable (Omitted Category)	Weighted Percent of Population (Mean)	Regression Coefficient Mean= .492	Weighted Percent of Population (Mean)	Regression Coefficient Mean=.560
(Did not receive AFDC in either 1973 or 1976	.375	-	.423	-
No AFDC in 1963, but received AFDC in 1976	.043	-.406**	.053	-.657**
Received AFDC in 1973, but no AFDC in 1976	.282	.086+	,292	-.034
Received AFDC in both 1973 and 1976	.300	-.277**	.232	-.453**
(Head employed full-time in both 1973 and 1976)	.180		.136	
Full-time to part-time	.046	.027	.037	-.334
Full-time to not working	.030	-.134	.037	-.421*
Part-time to full-time	.097	.127+	.106	-.198
Always part-time	.045	-.205**	.030	.046
Part-time to not working	.056	-.105	.080	-.319+
Not workig to full-time	.062	.107	.146	-.234+
Not working to part-time	.024	.029	.096	-.303*
Head not working in both 1973 and 1976	.460	-.230**	.332	-.263+
R^2 (Adjusted)		.349		.356

Significance Levels:

**.01 *.05 +.10

figures for different-headed households were 45.3 percent and 65.7 percent. It is also of interest to note that same-headed households which had stopped receiving AFDC in 1976 were also more likely to stop receiving food stamps, although this effect was only significant at the 10 percent level. This result did not hold for different-headed households.

For households with the same heads, change in employment status exhibited effects which corresponded closely to what was expected. Households in which the head worked less than 500 hours in both 1973 and 1976 had a 23.0 percent lower probability of quitting the food stamp program than households in which the head worked full-time in both years. In general, households in which the head was working less than full-time in 1976 had a lower probability of not using food stamps in 1976, and those households in which the head went from less than full-time work to full-time work had a higher probability of quitting the program. However, the results were most often not significant at the standard levels. For different-headed households, the results were more mixed. Virtually all other groups had a lower probability of quitting food stamps than the group which had a fully employed head in both years. The size of the coefficients for most groups was large, but most were insignificant at the 5 percent level.

In general, the other intervening change variables were insignificant in predicting quitting the food stamp program for both groups. There is evidence that households which always resided in rural areas were less likely to stop using food stamps. For same-headed households, an increase in the weeks of work missed by the head due to illness resulted in a lower probability of quitting food stamps, while changes in the head's wage rate had a significant effect on quitting the food stamp program among different-headed households.

Change in Children

The total, direct, and indirect effects of the change in children variables are shown in Table 5.7. For households with the same head the total effects of these variables are as expected. Families which gained at least one child under the age of seven had a 19.1 percent lower probability of quitting the use of food stamps. For households which had a younger child in both years, the probability of quitting was 15.4 percent lower. For both of these variables, the direct effect was considerably smaller and insignificant, indicating a primary role for the indirect effects. As might be expected, the major effect of these change in children variables operates through the two AFDC variables, "whether became an AFDC recipient" and "whether always an AFDC recipient." Because a household

Table 5.7 (page 1 of 2)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF CHANGE IN CHILDREN VARIABLES ON QUITTING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:						
Change in Children	Total Effect	Direct Effect	Change in Head's Illness Weeks	Whether Head Became Able	Whether Head Always Disabled	Whether Always Rural	Whether Became AFDC Recipient	Whether Always AFDC Recipient	Whether Full-time to Part-time Work
Same Head									
Change in number of children, age 0-17	-.021	-.23	-.0009	.0043	-	.0075	.0134	-.0122	-
(Never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	-.039	-.021	-	-	-	.0129	-	-	-
Gained children, age 0-6	-.191**	-.076	.0237	-	-	-	-.0386	-.0346	-
Always had children, age 0-6	-.154**	-.055	.0143	-	-	-	-.0284	-.0493	-
Different head									
Change in number of children, age 0-17	-.013	-.014	-	-	-	-	-	-	-.0147
(Never had children, age 0-6)	-	-	-	-	-	-	-	-	-
Lost children, age 0-6	-.278*	-.080	-	-	-.0713	-	-	-.1544	-
Gained children, age 0-6	-.333*	-.101	-	-	-.0331	-	-.1393	-	-
Always had children, age 0-6	-.212+	.020	-	-	-.0406	-	-	-.1459	-

Table 5.7 (page 2 of 2)

	Indirect Effect Operating Through:		
Family Composition Change	Whether Always Part-time	Whether Part-time to No Work	Whether Always No Work
Same Head			
Change in number of children, age 0-17	-	-	-
(Never had children, age 0-6)	-	-	-
Lost children, age 0-6	.0191	-	-
Gained children, age 0-6	-	-	-
Always had children, age 0-6	.0215	-	-.0304
Different Head			
Change in number of children, age 0-17	-	-.0110	-
(Never had children, age 0-6	-	-	-
Lost children, age 0-6	-	-	-.0500
Gained children, age 0-6	-	-	-
Always had children, age 0-6	-	-	-.0902

Significance Levels:

**.01 *.05 +.10

which gained a young child or always had a young child was more likely both to become an AFDC recipient or to have always been one, its probability of not quitting the food stamp program increased over 7 percent. In addition, households which always had young children were more likely to be headed by persons who worked less than 500 hours in both 1973 and 1976, and this decreased the probability of quitting by 3 percent, compared to those households which did not have a child under seven years old in both 1973 and 1976.

For households with a different head in 1976 than 1973, the picture is much the same. Households which either gained or always had a young child had significantly lower probabilities of quitting, and the effects were stronger than those found for same-headed households. In addition, even households which had lost a younger child had a substantially lower probability of quitting the food stamp program. The influence of all of these variables operated primarily through the AFDC variables, whose effect decreased the probability of quitting by approximately 14 to 15 percent for each of the three change-in-children categories. The change-in-children variables also operated through the fact that the heads of these different-headed households were more likely to be disabled in both years and not working.

Changes in Family Composition

The total, direct, and indirect effects of the family composition change variables are given in Table 5.8. As was the case with the analysis for joining the food stamp program, female-headed households dominated the results for the analysis of quitting the program. Households headed by females in 1976, regardless of the 1973 marital status of the women, were approximately 28 percent less likely to quit the food stamp program than were households headed by married couples. Again, the AFDC variables were the primary variables through which this total effect operated. Both divorced or widowed females and splitoff females were more likely either to become or remain AFDC recipients, and this factor lowered the probability of quitting food stamps between 22 and 26 percent, as compared to married couples. Unmarried female heads in both years were less likely to quit and more likely to remain AFDC recipients, and this lowered their probability of quitting food stamps by 11 percent. All of these groups of female household heads were more likely to have worked less than 500 hours in 1976, and this lowered their probability of quitting by approximately 10 percent.[14]

---

[14] As the appendix tables show, 1976 heads of households who were either divorced or widowed females or females who in 1973 were neither heads nor wives

Table 5.8 (page 1 of 2)

TOTAL, DIRECT, AND INDIRECT EFFFECTS OF FAMILY COMPOSITION CHANGE ON QUITTING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:					
Family Composition Change	Total Effect	Direct Effect	Change in Head's Wage Rate	Whether Head Became Able	Whether Always Rural	Whether Became AFDC Recipient	Whether Quit AFDC	Whether Always AFDC Recipient
Same Head								
(Married couple in 1973 and 1976)	-	-	-	-	-	-	-	-
Divorced, widowed male	-.030	-.026	-	.0155	-	-	-	-.0421
Unmarried male became married	-.799**	-.849**	-	-	-	-	-	-
Unmarried male head in 1973 and 1976	.160*	.156*	-	-.0368	.0181	-	-	-
Unmarried female head in 1973 and 1976	-.286*	-.099*	-	-	.0099	-	-.0079	-.1030
Different Head								
(Splitoff, married in 1976)	- (.047)[a]	- -.004	-	-	-	-	-	-
Divorced, widowed female	-.284) (-.229)**	-.004 (-.093)	-	-	-	-.1590	-	-.0924
Unmarried female became married	059 (.058)	.059 (.088)	.0755	- -	-.0389	-	-	-
Splitoff, unmarried male, in 1976	.195 (.228)*	-.107 (.038)	.1420	- -	-	-.0769	-	-
Splitoff, unmarried female in 1976	-.261* (-.180)*	-.141 (.-057)	-	-	-	-.0979	-	-.1237

[a] The coefficients in parentheses are differences from the omitted group, "Married couple in 1973 and 1976," obtained when the analysis was run on the entire sample.

Table 5.8 (page 2 of 2)

Family Composition Change	Indirect Effect Operating Through:					
	Whether Part-time to Full-time Work	Whether Always Part-time	Whether Part-time to No Work	Whether No Work to Full-time Work	Whether No Work to Part-time Work	Whether Always No Work
Same Head (Married couple in 1973 and 1976)	-	-	-	-	-	-
Divorced, widowed male	-	-	-	-	-	-.0412
Unmarried male became married	-	-	-	-	-	-
Unmarried male head in 1973 and 1976	-	-.0382	-	-	-	-.0320
Unmarried female head in 1973 and 1976	-.0137	-.0082	-	-	-	-.0925
Different head (Splitoff, married in 1976)	-	-	-	-	-	-
Divorced, widowed female	-	-	-.0402	.0901	-	-.0523
Unmarried female became married	-	-	-	.0739	-.0991	-
Splitoff, unmarried male in 1976	-	-	-	.0683	-	-.0623
Splitoff, unmarried female in 1976	-	-	-	.0667	-	-.1088

Significance Levels:

**.01 *.05

Splitoff men who were unmarried in 1976 were more likely than married couples to quit the food stamp program. The major identifiable reason for this was that these men experienced a wage increase of $2.63 more (compared to the 1973 head of the household) than splitoff married couples. (See Appendix Table A5.16.) This wage increase resulted in a 14.2 percent higher probability of not receiving food stamps in 1976.

Finally, there is the result that unmarried men in 1973 who were married by 1976 had a 77.9 percent lower probability of quitting the food stamp program. Not much can be said about this result, except that it involves a small, peculiar group--unmarried men who received food stamps in 1973. From the results of Chapter 4, it is clearly an unusual situation when a household headed by an unmarried male receives food stamps.

Demographic Variables

For households with a different head in 1976 than in 1973, none of the demographic variables had a significant total effect (at the 5 percent level) on quitting the food stamp program (Table 5.9). Among same-headed households, the probability of quitting was lower for blacks the less-educated, and households which had more children in 1973. Households headed by blacks were more likely to be headed by unmarried females in both years, and this decreased the probability of quitting by 2.7 percent. Also, households headed by blacks were more likely to experience an increase in the weeks of work missed by the head due to illness, and this lowered the probability of quitting by 1.2 percent. The other indirect effects for the demographic variables were small.

[illegible]UMMARY

In this chapter we have examined the use of food stamps over the four-year period 1973-1976. In the aggregate there was a slight increase in the percentage of households which used food stamps in 1976 as compared with 1973. However,

---

were less likely than a married household heads to go from no work in 1973 to full-time work in 1976. We might expect this factor also to lower the probability of quitting the food stamp program. However, we see in Table 5.6 the analogous result that the direct effect for different-headed households of going from not working to full-time work is to lower the probability of quitting food stamps. Since the above-mentioned groups are less likely to be in this category, the result is that this category of the change in employment status variables operates to increase their probability of quitting food stamps, a result seen in Table 5.8.

Table 5.9 (page 1 of 3)

TOTAL, DIRECT, AND INDIRECT EFFECTS OF DEMOGRAPHIC VARIABLES ON JOINING THE FOOD STAMP PROGRAM

			Indirect Effect Operating Through:							
Demographic Variable	Total Effect	Direct Effect	Whether Divorced, Widowed Male	Whether Unmarried Male Became Married	Whether Unmarried Male Head in 1973 and 1976	Whether Unmarried Female Head in 1973 and 1976	Whether Divorced, Widowed Female	Whether Unmarried Female Became Married	Whether Splitoff, Unmarried Male in 1976	Splitoff Unmarried Female in 1976
Same Head										
Whether black	-.093*	-.026	-	-	-	-.0266				
Age of 1976 head	-.0007	.0002	-	-	-	-				
Education of 1976 head	.0179*	.0091	-	-	-	-.0015				
Number of children age 0-17 in 1973	-.0250**	-.0262		.0046	-.0027	.0035				
Different Head										
Whether black	.055	.096					-	-	-	-
Age of 1976 head	-.0047*	-.0062					-	-	-	-
Education of 1976 Head	.0172	-.0072					-	-	-	-
Number of children Age 0-17 in 1973	-.0276	.0061					-	-	-	-

Table 5.9 (page 2 of 3)

Demographic Variable	Indirect Effect Operating Through:							
	Change in Head's Illness Weeks	Whether Head Became Able	Whether Head Always Disabled	Whether Always Rural	Whether Became AFDC Recipient	Whehter Quit AFDC	Whether Always AFDC Recipient	Whether Full-time to Part-time Work
Same Head								
Whether black	-.0117	-	-	.0088	-	-	-	-
Age of 1976 head	-	-.0003	-	-	-	-	.0011	-
Education of 1976 head	-.0014	.0016	-	.0037	-	-	.0065	-
Number of children age 0-17 in 1973	-.0027	.0019	-	.0020	.0050	-.0026	-.0159	-
Different Head								
Whether black	-	-	-	-	-	-	-	-
Age of 1976 head	-	-	-.0014	-	.0030	-	-	-
Education of 1976 head	-	-	.0055	-	-	-	-	-
Number of children age 0-17 in 1973	-	-	-	-	-	-	-	-.0177

Table 5.9 (page 3 of 3)

Demographic Variable	Indirect Effect Operating Through: Whether Part-time to Full-time Work	Whether Always Part-time	Whether part-time to No Work	Whether No Work to Full-time Work	Whether No Work to Part-time Work	Whether Always No Work
Same Head						
Whether black	-	-	-	-	-	-
Age of 1976 head	-.0005	.0004	-	-	-	-.0028
Education of 1976 head	.0009	-.0018	-	-	-	.0049
Number of children age 0-17 in 1973	-.0017	-	-	-	-	-
Different Head						
Whether black	-	-	.0376	-.0417	-	-
Age of 1976 head	-	-	.0013	-	-	-.0032
Education of 1976 head	-	-	-.0046	-	-	.0087
Number of children age 0-17 in 1973	-	-	-	-	.0130	.0122

Significance Levels:

**.01 *.05

this slight aggregate change masked considerable turnover in the population of food stamp users. For example, one-half of the sample households which participated in the food stamp program in 1973 did not use food stamps in 1976. Only 2.8 percent of the sample used food stamps all four years, while 14.8 percent of the households participated in at least one of the four years.

Employing a path model regression analysis, we attempted--with some success--to identify the factors which are important in determining whether a household joins or quits the food stamp program. A household's connection to the AFDC or public assistance program was by far the most crucial variable in explaining a household's decision to begin or to stop using food stamps. Households which received AFDC or general assistance payments in 1976 had markedly higher probabilities of joining the program and lower probabilities of quitting food stamps. This finding corresponds to the cross-sectional finding of Chapter 4, in which the reason for this large differential was attributed primarily to the better information which welfare households have concerning their eligibility for food stamps, as well as to their less adverse attitudes toward receiving welfare.

The presence of children in the household, especially preschool children, was important in predicting a change in food stamp use. An increase in the number of children in the household under the age of 18 increased the probability of joining the food stamp program, a result which also corresponds to the cross-sectional findings of Chapter 4. Having a child under the age of seven in the household both increased the probability of joining the program and decreased the probability of quitting the use of food stamps. The effect of a household being headed by a woman was also significant. Female-headed households had approximately a 5 percent greater probability of joining the food stamp program and a 27 percent lower probability of quitting it. Households headed by females and households with more children, especially younger children, were more likely to receive AFDC or general assistance payments, and this factor accounted for a substantial fraction of the increased probabilities of the use of food stamps for these groups.

Thus we see that we have learned something from this initial look at the dynamics of joining and quitting the food stamp program. However, many questions remain. The overwhelming importance of being connected to the welfare system stands out, but it leaves one wondering how people initially become connected to the system. Another puzzling aspect of the results is that often the end state position was the key explanatory factor, rather than the strict change variable.

For example, the effect of being a welfare recipient in both 1973 and 1976 was very similar to the effect of being a recipient of welfare in 1976 but not in 1973. The effect of gaining a child under the age of seven was virtually the same as the effect of always having a child under that age. A similar pattern occurred for other variables, such as change in employment status. One is left with the uneasy feeling that the model is missing some important changes which influenced the decision to join the food stamp program. There is no question that some potentially important variables have not been included in the model. There is nothing on benefit levels to which households are entitled, a factor often mentioned as influential in determining the use of food stamps. We have not attempted in this part of the analysis to determine which households are eligible to receive food stamps, an obviously important aspect of the decision to participate.[15] Additional analysis will have to be done before we can be confident that we have a full understanding of the dynamics of food stamp use.

References

Bickel, Gary, and MacDonald, Maurice. "Participation Rates in the Food Stamp Program: Estimated Levels, by State." Discussion Paper 253-75. Madison: Institute for Research on Poverty, 1975.

Boskin, Michael J., and Nold, Frederick. "A Markov Model of Turnover in Aid to Families with Dependent Children." The Journal of Human Resources, Fall 1975.

Clarkson, Kenneth. "Welfare Benefits of the Food Stamp Program." Southern Economic Journal, July 1976.

Coe, Richard. "Participation in the Food Stamp Program among the Poverty Population." In Five Thousand American Families--Patterns of Economic Progress, Vol. V, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1977.

_____. "Dependency and Poverty in the Short and Long Run." In Five Thousand American Families--Patterns of Economic Progress, Vol. VI, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research,

---

[15] We did attempt to introduce into the model a crude proxy for change in eligibility status--change in the poverty state of the household. This addition added virtually nothing to the explanatory power of the model. Furthermore, the significant results which were discovered often were the opposite of expectations. Change in poverty status is too imprecise a measure to change in eligibility. While one may be reasonably confident that most poverty households are eligible for food stamps, it is not true that most eligible households are in poverty, at least under the eligibility criteria in effect in the 1973-1976 time period.

1978.

_____. "Sensitivity of the Incidence of Poverty to Different Measures of Income." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. IV, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1976.

Hoffman, Saul, and Holmes, John. "Husbands, Wives, and Divorce." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. IV, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1976.

Holmer, Martin. "The Sensitivity of Transfer Payments to Changes in Policy." Unpublished manuscript prepared for the Office of Income Security Policy, Department of Health, Education and Welfare (July, 1976).

Lane, Jonathan P., and Morgan, James N. "Patterns of Change in Economic Status and Family Structure." In *Five Thousand American Families--Patterns of Economic Progress*, Vol. III, edited by Greg J. Duncan and James N. Morgan. Ann Arbor: Institute for Social Research, 1975.

Lyon, David W. "Welfare Policy Research for New York City: Findings on the Dynamics of Dependency." Rand Paper Series, p-5566. Santa Monica, California: The Rand Corporation, December 1975.

MacDonald, Maurice. *Food, Stamps, and Income Maintenance*. Institute for Research on Poverty: Poverty Policy Analysis Series. New York: Academic Press, 1977.

Seagrave, Charles. "Food Stamps." *The Cyclical Behavior of Transfer Income Programs: A Case Study of the Current Recession*. U. S. Department of Health, Education, and Welfare, 1975.

U. S. Bureau of Census. *Characteristics of Households Purchasing Food Stamps*. Current Population Reports, Series p-23, No. 61. Washington, D. C.: U. S. Department of Commerce, 1976.

U. S. Department of Agriculture. "Food Stamp Program--Statistical Summary of Operations." Food and Nutrition Service, Washington, D. C. 1974-1977.

Appendix to Chapter 5

Description of Variables

The following is a detailed description of the variables used in the analysis. Some are self-explanatory.

I. Background Variables

1) Whether Black: A dichotomous variable coded 1 if the head of the 1973 Household was black, zero otherwise.

2) Age of the Head of the 1976 Household.

3) Education of the Head of the 1976 Household: coded in years.

4) Number of Children Age 0-17 in the 1973 Household.

II. Family Composition Change

A. Same Head

1) Married Couple in Both 1973 and 1976: A dichotomous variable coded 1 if the marital status of the head of the household was married in both 1973 and 1976; zero otherwise.

2) Married in 1973, Unmarried Male Head in 1976: A dichotomous variable coded 1 if the 1976 household was headed by an unmarried male who was married in 1973; zero otherwise.

3) Unmarried Male Head in 1973, Married in 1976: A dichotomous variable coded 1 if the marital status of the head of the 1976 household was married, and such head was unmarried and heading his own household in 1973.

4) Unmarried Male Head in 1973 and 1976.

5) Unmarried Female Head in 1973 and 1976.

B. Different Head

1) Splitoff, Married Couple in 1976: A dichotomous variable coded 1 if the 1976 household was headed by a married couple, and the relevant sample person of that couple was a member of another household in 1973, but was neither the head nor the wife; zero otherwise.

2) Married in 1973, Unmarried Female Head in 1976: A dichotomous variable coded 1 if the 1976 household was headed by an unmarried female who was married in 1973; zero otherwise.

3) Unmarried Female Head in 1973, Married in 1976: A dichotomous variable

coded 1 if the 1976 household was headed by a married couple, and the wife was unmarried and headed a household in 1973.

4) Splitoff, Unmarried Male Head in 1976: A dichotomous variable coded 1 if the 1976 household was headed by an unmarried male who was a member of another household in 1973, but was not the head; zero otherwise.

5) Splitoff, Unmarried Female Head in 1976: A dichotomous variable coded 1 if the 1976 household was headed by an unmarried female who was a member of another household in 1973, but was neither the head nor the wife of that household; zero otherwise.

III. Change in Children

1) Change in Number of Children, Age 0-17: The number of children in the household under the age of 18 in 1976 minus the number of children in the household under the age of 18 in 1973.

2) Change in Whether Children Age 0-6: A four-category variable:

   a) No Children Age 6 or Younger in 1973 and 1976: If the relevant sample person was in a household in both 1973 and 1976 which had no children under the age of seven in either year. It need not necessarily be the same household in both years.

   b) Lost Children Age 0-6: If the relevant sample person was in a household in 1973 which had at least one child under the age of seven, and was in a household in 1976 which had no such children.

   c) Gained Children Age 0-6: If the relevant sample person was in a household in 1973 which had no children under the age of seven, and was in a household in 1976 which had at least one such child.

   d) Had Children Age 0-6 in Both 1973 and 1976.

IV. Intervening Change Variables

1) Change in Head's Illness Hours: The number of weeks the Head of the 1976 Household missed from work in 1976 due to illness or injury minus the number of weeks the head of the 1973 household missed in 1973 for the same reason.

2) Change in Head's Unemployment and Strike Weeks: The number of weeks the head of the 1976 household missed from work in 1976 due to unemployment or strikes minus the number of weeks the head of the 1973 household missed in 1973 for the same reason.

3) Change in Wife's Work Weeks: The number of weeks the wife of the 1976 household (if any) worked in 1976 minus the number of weeks the wife of the 1973 household (if any) worked in 1973. If there was no wife in the

household at the relevant time, the number of weeks worked would equal zero. Thus, for example, a working woman who was married in 1973 and divorced by 1976 would show a negative value for this variable.

4) Change in Head's Wage Rate: The 1976 wage rate of the head minus the 1973 wage rate of the head of the 1973 household inflated to 1976 dollars. This variable was coded in dollars per hour.

5) Change in Rent: The rent paid by the household in 1976 minus the rent paid in 1973 by the household containing the relevant sample person in 1973. The 1973 rent was adjusted to 1976 dollars. This variable was coded in $10 units.

6) Change in Head's Disability: A four-category variable:
   a) Head Never Disabled: If the head of the 1976 household did not report in 1976 that he/she had a physical or nervous condition which completely or severely limited his/her work, and the same for the head of the 1973 household of which the relevant sample person was a member.
   b) Head Became Disabled: If the Head of the 1973 household reported no disability and the head of the 1976 household reported a disability.
   c) Head Became Able: If the head of the 1973 household reported a disability and the head of the 1976 household reported no disability.
   d) Head Always Disabled: If the head of the 1973 household reported a disability and the head of the 1976 household reported a disability.

7) Change in City Size: A four-category variable:
   a) Always Urban: If both the 1973 and the 1976 household resided in a county which the largest city had a population of at least 50,000.
   b) Urban to Rural: If the 1973 household resided in a county with a city of 50,000 and the 1976 household did not.
   c) Rural to Urban.
   d) Always Rural.

8) Change in AFDC Status: A four-category variable:
   a) Did Not Receive AFDC in Either 1973 and 1976 (Never AFDC): If neither the 1973 household nor the 1976 household had any members who received either AFDC or general assistance payments.
   b) No AFDC in 1973, But Received AFDC in 1976 (Joined AFDC).
   c) Received AFDC in 1973, But No AFDC in 1976 (Quit AFDC).
   d) Received AFDC in Both 1973 and 1976 (Always AFDC).

9) Change in Head's Employment Status: This is a nine-category variable based on changes in the head of the household's work hours in between 1973 and 1976. The categories are self-explanatory if one remembers the following definitions:

   a) Full-time: 1,500 work hours or more in the year.
   b) Part-time: 500-1,499 work hours in the year.
   c) Not Working: Less than 500 work hours in the year.

V. Change in Food Stamp Use

   1) Whether Used Food Stamps in 1976: A dichotomous variable coded 1 if any members of the household received food stamps at any time in 1976.

MATHEMATICAL STATEMENT OF THE MODEL

The model estimated in this chapter can be represented by four equations:

(1) $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$

(2) $X_1 = \alpha_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4$

(3) $X_2 = \gamma_1 + \gamma_2 X_3 + \gamma_3 X_4$

(4) $X_3 = \sigma_1 + \sigma_2 X_4$

where Y = change in food stamp use
X_1 = vector of intervening change variables
X_2 = vector of change in children variables
X_3 = vector of family composition change variables
X_4 = vector of demographic variables

The coefficients $\beta_1, \ldots \beta_4$ are the direct effects on change in food stamp use of an unit change in the different variables. To find the total effect of an unit change in a particular variable, we must substitute Equations 2 through 4 into Equation 1. To illustrate, we will show how to derive the total effect of an unit change in the change in children variables (X_2). Substituting Equation 2 into Equation 1 yields:

$$Y = \beta_0 + \beta_1 (\alpha_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4) + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

Rearranging,

(5) $Y = \beta_0 + \beta_1 \alpha_1 + (\beta_1 \alpha_2 + \beta_2) X_2 + (\beta_1 \alpha_3 + \beta_3) X_3 + (\beta_1 \alpha_4 + \beta_4) X_4$

An unit change in the change in children variables (X_2), therefore, has a total effect of $\beta_1 \alpha_2 + \beta_2$ on change in food stamp use, controlling for family composition change (X_3) and the demographic characteristics (X_4). From Equation 1, we know that β_2 is the direct effect of the change in children variables. $\beta_1\alpha_2$ is the indirect effect of change in children operating through the intervening change variables. β_1 is the effect of an unit change in the intervening change variables on change in food stamp use, and α_2 is the effect of an unit change in change in children on the intervening change variables.

Table A5.1 (page 1 of 3)

REGRESSIONS WITH JOINING THE FOOD STAMP PROGRAM AS THE DEPENDENT VARIABLE
(Same head N = 4050; Mean = .040)

Independent Variables	(1)	(2)	(3)	(4)
Background Variables				
Whether black	.056** (.011)	.048** (.011)	.048** (.011)	.015 (.010)
Age of 1976 head	-.0015** (.0002)	-.0017** (.0002)	-.0015** (.0002)	-.0017** (.0002)
Education of 1976 head	-.0084** (.0010)	-.0083** (.0010)	-.0083** (.0010)	-.0053** (.0009)
Number of children age 0-17 in household in 1973	.0046* (.0022)	.0070** (.0023)	.0139** (.0031)	.0106** (.0028)
	R^2 = .039			
Family Composition Change				
(Married couple in both 1973 and 1976)		-	-	-
Divorced, widowed male		-.019 (.018)	.001 (.019)	-.007 (.017)
Unmarried male head became married		.018 (.022)	.016 (.022)	-.005 (.020)
Unmarried male head in 1973 and 1976		.009 (.012)	.008 (.012)	-.003 (.011)
Unmarried female head in 1973 and 1976		.053** (.008)	.057** (.008)	.027** (.008)
		R^2 = .049		

Table A5.1 (page 2 of 3)

Independent Variables	(3)	(4)
Change in Children		
Change in number of children age 0-17	.025** (.006)	.023** (.005)
(No children age 6 or less in 1973 and 1976)	-	-
Lost children age 0-6	-.008 (.012)	-.009 (.011)
Gained children age 0-6	(.017)	(.015)
Had children age 0-6 in both 1973 and 1976	.010 (.011)	.007 (.010)
	R^2 = .057	
Intervening Change Variables		
Change in head's illness weeks		.0013+ (.0007)
Change in head's unemployment strike weeks		.0019** (.0004)
Change in wife's work weeks		-.0002 (.0002)
Change in rent ($10)		.0011* (.0004)
Change in head's wage		-.0010+ (.0006)
Head never disabled		-
Head became able		.016 (.016)
Head became disabled		.001 (.013)
Head always disabled		.031+ (.017)

Table A5.1 (page 3 of 3)

Independent Variables	(4)
(Always urban)	-
Urban to rural	.004 (.019)
Rural to urban	.011 (.019)
Always rural	-.011+ (.006)
(Never AFDC)	-
Became AFDC	.512** (.021)
Quit AFDC	.055* (.024)
Always AFDC	.526** (.041)
(Always employed)	-
Full-time to part-time	.084** (.012)
Full-time to no work	.054** (.013)
Part-time to full-time	.004 (.017)
Always part-time	.090** (.016)
Part-time to no work	.026 (.016)
Unemployed to full-time	-.021 (.030)
Unemployed to part-time	.055* (.027)
Remained unemployed	.041** (.011) R^2 = .244

Significance Tests:
**.01 *.05 +.10

Table A5.2

REGRESSIONS OF FAMILY COMPOSITION CHANGE ON DEMOGRAPHIC VARIABLES; JOINING FOOD STAMP PROGRAM
(Same head)

Demographic Variables	Divorced, Widowed Male	Unmarried Male Head Became Married	Unmarried Male Head in 1973 and 1976	Unmarried Female Head in 1973 and 1976
Whether black	.004 (.009)	-.005 (.008)	.074** (.014)	.136** (.022)
Age of 1973 head	-.0004* (.0002)	-.0011** (.0001)	-.0008** (.0003)	.0041** (.0004)
Education of 1973 head	-.0018* (.0008)	-.0001 (.0007)	.0018 (.0013)	-.0026 (.0020)
Number of children age 0-17 in 1973	-.0036+ (.0019)	-.0125** (.0016)	-.0351** (.0029)	-.0422** (.0044)
R2	.001	.023	.041	.081

Significance Tests:

**.01 *.05 +.10

Table A5.3

REGRESSIONS WITH CHANGE IN CHILDREN AS THE DEPENDENT VARIABLE; JOINING THE FOOD STAMP PROGRAM
(Same head)

Independent Variables	Change in Number of Children, 0-17	Whether Lost Children Age 0-6	Whether Gained Children, Age 0-6	Whether Always Had Children, Age 0-6
Whether black	.045 (.037)	-.016 (.015)	.031** (.011)	.006 (.019)
Age of 1973 head	-.0109** (.0007)	-.0015** (.0003)	-.0032** (.0002)	-.0059 (.0003)
Education of 1973 head	-.0021 (.0034)	-.0025+ (.0013)	-.0026** (.0010)	-.0009 (.0017)
Number of children age 0-17 in 1973	-.3064** (.0078)	.0553** (.0031)	-.0289** (.0024)	.0571** (.0039)
(Married couple in 1973 and 1976)	-	-	-	-
Divorced, widowed male	-.683** (.063)	.206** (.025)	-.069** (.019)	-.179** (.031)
Unmarried male head became married	.294** (.076)	-.023 (.030)	.133** (.023)	-.182** (.038)
Unmarried male head in 1973 and 1976	-.292** (.042)	.004 (.017)	-.085** (.013)	-.139** (.021)
Unmarried female head in 1973 and 1976	-.149** (.027)	.028** (.011)	-.033** (.008)	-.083** (.014)
	R2 =.300	.117	.095	.213

Significance Tests:

**.01 *.05 +.10

Table A5.4 (page 1 of 3)

REGRESSIONS WITH INTERVENING CHANGE VARIABLES AS THE DEPENDENT VARIABLE JOINING THE FOOD STAMP PROGRAM (Same head)

Independent Variable	Change in Head's Illness Weeks	Change Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage Rate	Head Became Able	Head Became Disabled	Head Always Disabled
Whether black	.001 (.021)	-1.29** (.39)	-.174 (.913)	.777* (.346)	-.131 (.274)	.027** (.010)	.010 (.012)	.030** (.010)
Age of 1972 head	-.0031 (.0045)	-.0287** (.0080)	.0466** (.0188)	.0240** (.0071)	-.0013 (.0056)	.0016** (.0002)	.0021** (.0002)	.0016** (.0002)
Education of 1973 head	-.0024 (.0201)	-.1567** (.0352)	-.0091 (.0831)	.0190 (.0315)	.0081 (.0249)	-.0026** (.0009)	-.0040** (.0011)	-.0045** (.0009)
Number of children age 0-17 in 1973	.0096 (.0635)	-.1137 (.1115)	1.37** (.26)	.0731 (.0996)	-.049 (.079)	-.0076** (.0029)	-.0029 (.0035)	-.00548 (.0028)
Divorced, widowed male	-.059 (.382)	-.235 (.670)	-9.50** (1.58)	.685 (.598)	.780+ (.473)	.026 (.018)	.001 (.021)	.005 (.017)
Unmarried male head became married	-.292 (.457)	-.112 (.803)	14.61** (.189)	3.64 (.72)	1.05+ (.57)	-.005 (.021)	-.000 (.025)	-.009 (.020)
Unmarried male head in 1973 and 1976	-.275 (.253)	-.712 (.444)	1.90+ (1.05)	1.78** (.40)	.87** (.31)	.025** (.012)	.028** (.014)	.029** (.011)
Unmarried female head in 1973 and 1976	-.079 (.163)	-.445 (.286)	1.24+ (.67)	1.02** (.26)	.85** (.20)	.016* (.008)	.034** (.009)	.004 (.007)
Change in number of children age 0-17	.217* (.112)	-.396* (.196)	1.08* (.46)	-.284 (.175)	.186 (.138)	-.003 (.005)	-.007 (.006)	-.004 (.005)
Lost children, age 0-6	.217 (.250)	.536 (.438)	1.70+ (1.02)	-.105 (.391)	.503 (.310)	.011 (.011)	.003 (.014)	.024* (.011)
Gained children, age 0-6	.153 (.347)	1.94** (.61)	-11.44** (1.44)	.291 (.544)	1.10** (.43)	.009 (.016)	.015 (.019)	.018 (.015)
Always had children, age 0-6	.006 (.227)	.420 (.398)	.621 (.940)	.331 (.356)	.689* (.282)	.012 (.010)	.003 (.012)	.010 (.010)
R^2	.000	.012	.049	.016	.009	.042	.049	.047

Table A5.4 (page 2 of 3)

Independent Variable	Urban to Rural	Rural to Urban	Always Rural	Became AFDC	Quit AFDC	Always AFDC	Full-time to Part-time	Full-time to No Work
Whether black	-.008 (.008)	-.020* (.008)	-.123** (.025)	.035** (.007)	.034** (.007)	.018** (.004)	.000 (.014)	-.011 (.013)
Age of 1973 head	-.0004* (.0002)	-.0004* (.0002)	.0023** (.0005)	-.0005** (.0002)	-.0001 (.0001)	.0000 (.0001)	-.0021** (.0003)	.0004 (.0003)
Education of 1973 head	.0009 (.0007)	-.0009 (.0008)	-.262** (.0023)	-.0033** (.0007)	-.0015** (.0006)	-.0006+ (.0003)	-.0029** (.0013)	-.0039** (.0012)
Number of children age 0-17 in 1973	-.0006 (.0023)	.0011 (.0024)	-.0061 (.0073)	.0066** (.0021)	.0016 (.0019)	.0049** (.0011)	-.0003 (.0041)	-.0106** (.0037)
Divorced, widowed male	.021 (.014)	.022 (.014)	.023 (.044)	-.005 (.013)	.009 (.011)	.001 (.006)	.038 (.025)	-.027 (.022)
Unmarried male head became married	.017 (.017)	.017 (.017)	-.107* (.053)	.020 (.015)	.001 (.014)	.004 (.008)	.044 (.030)	-.029 (.027)
Unmarried male head in 1973 and 197	.014 (.009)	.028** (.010)	-.024 (.029)	-.002 (.008)	.035** (.008)	.004 (.004)	-.022 (.016)	.002 (.015)
Unmarried female head in 1973 and 1976	-.007 (.006)	.022** (.006)	-.050** (.019)	.021** (.005)	.034** (.005)	.015** (.003)	.004 (.011)	-.037** (.010)
Change in number of children Age 0-17	.004 (.004)	.002 (.004)	-.016 (.013)	.009* (.004)	-.003 (.003)	.001 (.002)	-.014* (.007)	-.005 (.007)
Lost children, age 0-6	.007 (.009)	.002 (.009)	.058* (.029)	-.000 (.008)	-.002 (.007)	.001 (.004)	-.043** (.016)	-.022 (.015)
Gained children, age 0-6	.013 (.013)	.025+ (.013)	.082* (.040)	.028* (.012)	.009 (.010)	.007 (.006)	.007 (.022)	-.023 (.020)
Always had children age 0-6	.017* (.008)	.001 (.009)	.103** (.026)	.001 (.008)	.003 (.007)	.006 (.004)	-.045** (.015)	.-007 (.013)
R2	.009	.005	.055	.028	.026	.024	.016	.012

Table A5.4 (page 3 of 3)

Independent Variable	Part-time to Full-time	Always Part-time	Part-time to No Work	No Work to Full-time	No Work to Part-time	Remained Not Working
Whether black	.021* (.009)	.024* (.010)	-.003 (.010)	-.003 (.005)	.018** (.006)	-.005 (.016)
Age of 1973 head	-.0015** (.0002)	.0002 (.0002)	.0014** (.0002)	-.0005** (.0001)	.0000 (.0001)	.0119** (.0003)
Education of 1973 head	.0002 (.0008)	.0030** (.0009)	-.0014 (.0009)	-.0003 (.0005)	-.0001 (.0005)	-.0014** (.0015)
Number of children age 0-17 in 1973	-.0024 (.0026)	-.0086** (.0027)	-.0024 (.0029)	-.0036 (.0013)	.0006 (.0017)	-.0204** (.0047)
Divorced, widowed male	-.001 (.016)	-.011 (.017)	-.026 (.017)	-.009 (.009)	.012 (.010)	.131** (.028)
Unmarried male head became married	.010 (.019)	.013 (.020)	-.009 (.021)	-.013 (.011)	-.005 (.012)	.098** (.034)
Unmarried male head in 1973 and 1976	.011 (.010)	.009 (.011)	.000 (.011)	-.009 (.006)	.011 (.007)	.171** (.019)
Unmarried female head in 1973 and 1976	.028** (.007)	.036** (.007)	.010 (.007)	.013** (.004)	.025** (.004)	.152** (.012)
Change in number of children, age 0-17	.009* (.005)	-.001 (.005)	.005 (.005)	-.004 (.003)	.005+ (.003)	.003 (.008)
Lost children, age 0-6	.004 (.010)	.009 (.011)	.001 (.011)	-.008 (.006)	-.003 (.007)	.087** (.018)
Gained children, age 0-6	-.022 (.014)	-.017 (.015)	-.001 (.016)	-.005 (.008)	-.013 (.009)	.098** (.025)
Always had children, age 0-6	-.024** (.009)	-.001 (.010)	.001 (.010)	-.005 (.005)	-.010+ (.006)	.119** (.017)
R2	.025	.018	.024	.007	.014	.405

Significance Tests:
**.01 *.05 +.10

Table A5.5 (page 1 of 3)

REGRESSIONS WITH JOINING FOOD STAMPS AS DEPENDENT VARIABLE
(Different Heads, N = 1082, Mean = .076)

Independent Variables	(1)	(2)	(3)	(4)
Demographic Variables				
Whether black	.099**	.103**	.086**	.060**
	(.025)	(.025)	(.025)	(.021)
Age of 1976 head	-.0024**	-.0034**	-.0024**	-.0014*
	(.0006)	(.0007)	(.0007)	(.0007)
Education of 1976 head	-.0151**	-.0144**	-.0100**	-.0026
	(.0035)	(.0035)	(.0035)	(.0030)
Number of children age 0-17 in 1973	.0120*	.0127**	.0343**	.0198*
	(.0050)	(.0049)	(.0113)	(.0094)
R2=	.059			
Family Composition Change				
(Splitoff, married couple in 1976)		-	-	-
Divorced, widowed female		.057*	.044	-.043+
		(.026)	(.027)	(.024)
Unmarried female head became married		.060+	.037	.017
		(.031)	(.032)	(.028)
Splitoff, unmarried male head in 1976		-.059*	-.020	-.063**
		(.024)	(.025)	(.021)
Splitoff, unmarried female head in 1976		.052*	.065**	-.044*
		(.023)	(.023)	(.020)
R2 =		.076		

Table A5.5 (page 2 of 3)

Independent Variables	(3)	(4)
Change in Children		
Change in number of children age 0-17	.025** (.012)	.013** (.010)
(No children age 6 or less in 1973 and 1976)	-	-
Lost children age 0-6	-.030 (.029)	.003 (.024)
Gained children age 0-6	.081** (.028)	.029 (.024)
Had children age 0-6 in both 1973 and 1976	.077* (.035)	-.016 (.029)
	R2 = .102	
Intervening Change Variables Variables		
Change in head's illness weeks		.0024 (.0017)
Change in head's unemployment strike weeks		-.0008 (.0008)
Change in wife's work weeks		-.0006* (.0002)
Change in rent ($10)		.0005 (.0007)
Change in head's wage		-.0036* -(.0016)
Head never disabled (Head never disabled)		-
Head became able		-.024 (.026)
Head became disabled		.031 (.035)
Head always disabled		-.061 (.050)

Table A5.5 (page 3 of 3)

Independent Variables	(4)
(Always urban)	-
Urban to rural	.033 (.029)
Rural to urban	-.003 (.028)
Always rural	.004 (.016)
(Never AFDC)	-
Became AFDC	.617** (.031)
Quit AFDC	-.000 (.050)
Always AFDC	.495** (.068)
(Always employed)	-
Full-time to part-time	.082** (.022)
Full-time to unemployed	.125** (.026)
Part-time to full-time	-.022 (.025)
Always part-time	.131** (.041)
Part-time to unemployed	-.005 (.049)
Unemployed to full-time	.040 (.031)
Unemployed to part-time	.143** (.043)
Remained unemployed	.068* (.033) R^2= .424

Significance Levels:

** .01   * .05   + .10

Table A5.6

REGRESSIONS OF FAMILY COMPOSITION CHANGE ON DEMOGRAPHIC VARIABLES; JOINING FOOD STAMPS
(Different Head)

Demographic Variable	Divorced, Widowed Female	Female Head Became Married	Splitoff, Unmarried Male Head	Splitoff, Unmarried Female Head
Whether black	-.027 (.034)	-.008 (.027)	.092** (.035)	.065+ (.037)
Age of 1976 head	.0161** (.0008)	.0014* (.0006)	-.0050** (.0008)	-.0039** (.0008)
Education of 1976 head	-.0156** (.0048)	.0080* (.0038)	.0031 (.0049)	-.0031 (.0051)
Number of children age 0-17 in 1973	.0050 (.0067)	-.0091+ (.0053)	-.0004 (.0069)	-.0087 (.0073)
R^2	.375	.011	.054	.022

Significance Levels:

** .01 * .05 + .10

Table A5.7

REGRESSIONS WITH CHANGE IN CHILDREN AS DEPENDENT VARIABLE JOINING THE FOOD STAMP PROGRAM
(Different Head)

Independent Variables	Change in Number of Children, 0-17	Whether Lost Children Age 0-6	Whether Gained Children, Age 0-6	Whether Always Had Children, Age 0-6
Whether black	.254** (.077)	-.029 (.027)	.055+ (.031)	.075** (.025)
Age of 1973 head	-.0161** (.0021)	-.0010 (.0007)	-.0040** (.0008)	-.0046** (.0007)
Education of 1976 head	-.0601** (.0107)	.0042 (.0037)	-.0248** (.0043)	-.0105** (.0035)
Number of children age 0-17 in 1973	-.8390** (.0152)	.0550** (.0053)	-.0207** (.0061)	.0303** (.0049)
Divorced, widowed female	.725** (.078)	.106** (.027)	-.177** (.031)	.170 (.025)
Unmarried female head became married	.856** (.095)	.046 (.033)	-.055 (.038)	.102** (.031)
Splitoff, unmarried male head in 1976	-.482** (.073)	.035 (.026)	-.237** (.029)	-.089** (.024)
Splitoff, unmarried female head in 1976	-.085 (.072)	.026 (.102)	-.109** (.115)	-.024 (.138)
	R2=.774	.102	.115	.138

Significance Levels:

**.01 +.10

Table A5.8 (page 1 of 3)

REGRESSIONS WITH INTERVENING CHANGE VARIABLES AS THE DEPENDENT VARIABLE JOINING THE FOOD STAMP PROGRAM (Different Head)

Independent Variable	Head's Illness Weeks	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage Rate	Head Became Able	Head Became Disabled	Head Always Disabled
Whether black	-.123	-1.82*	-2.27	-.366	.317	.066**	.064**	.019
	(.374)	(.88)	(2.51)	(.879)	(.409)	(.025)	(.019)	(.013)
Age of 1976 head	-.0070	-.0027	.226**	.0060	.0194+	.0016*	.0030**	.0012**
	(.0106)	(.0249)	(.071)	(.0248)	(.0115)	(.0007)	(.0005)	(.0004)
Education of 1976 head	-.0117	.1145	-.255	.835**	.2080**	-.0055	-.0099**	-.0039*
	(.0528)	(.1246)	(.355)	(.124)	(.0577)	(.0035)	(.0027)	(.0018)
Number of children age 0-17 in 1973	-.0518	.0408	2.48*	-.279	-.4670*	.0015	-.0074	-.0133+
	(.1685)	(.3977)	(1.13)	(.396)	(.1842)	(.0111)	(.0085)	(.0069)
Divorced, widowed female	.047	-.075	-24.99**	-3.73**	.558	.008	-.014	.031*
	(.410)	(.967)	(12.75)	(.96)	(.448)	(.027)	(.021)	(.014)
Unmarried female head became married	.804+	-.790	-1.10	-8.08**	3.33**	-.022	-.030	-.009
	(.481)	(1.135)	(3.23)	(1.13)	(.53)	(.032)	(.024)	(.017)
Splitoff, unmarried male head in 1976	.599	2.17*	-18.38**	-2.70**	-.91*	.023	.081**	-.005
	(.368)	(.87)	(2.47)	(.86)	(.40)	(.024)	(.019)	(.013)
Splitoff, unmarried female head in 1976	.552	-.175	-18.32**	-1.02	-.67+	.076**	-.008	.003
	(.347)	(.818)	(2.33)	(.81)	(.38)	(.023)	(.017)	(.012)
Change in number of children age 0-17	-.063	-.427	1.53	-.281	-.44*	.010	.006	-.011+
	(.174)	(.410)	(1.17)	(.407)	(.19)	(.012)	(.009)	(.006)
Lost children, age 0-6	-.089	-.223	-.656	.525	.495	.033	.003	-.015
	(.434)	(1.024)	(2.91)	(1.019)	(.474)	(.029)	(.022)	(.015)
Gained children, age 0-6	.091	1.89+	-13.26**	1.03	1.30**	.012	-.009	.000
	(.424)	(1.00)	(2.85)	(1.00)	(.46)	(.028)	(.021)	(.015)
Always had children, age 0-6	-.093	1.11	-4.95	-.458	2.55**	.019	.002	.009
	(.515)	(1.21)	(3.45)	(1.208)	(.56)	(.034)	(.026)	(.018)
R2=	-.003	.013	.124	.122	.074	.031	.115	.061

Table A5.8 (page 2 of 3)

Independent Variables	Urban to Rural	Rural to Urban	Always Rural	Became AFDC	Quit AFDC	Always AFDC	Full-time to Part-time	Full-time to No Work
Whether black	-.050** (.022)	.015 (.023)	-.106* (.041)	.029 (.021)	.024+ (.013)	.007 (.009)	-.063* (.031)	.036 (.027)
Age of 1976 head	-.0013* (.0006)	.0003 (.0006)	.0023+ (.0012)	-.0017** (.0006)	.0001 (.0004)	-.0003 (.0003)	-.0036** (.0044)	-.0011 (.0038)
Education of 1976 head	-.0031 (.0031)	.0028 (.0032)	-.0295** (.0059)	-.0056 (.0030)	-.0013 (.0018)	-.0054** (.0013)	.0021 (.0044)	-.0061 (.0038)
Number of children age 0-17 in 1973	.0051 (.0098)	-.0102 (.0102)	-.016[illegible] (.01[illegible]	.0286** (.0095)	.0255** (.0058)	-.0057 (.0042)	-.0171 (.0139)	.0313** (.0121)
Divorced, widowed female	.023 (.024)	-.033 (.025)	-.109* (.045)	.091** (.023)	-.008 (.014)	-.005 (.010)	.102** (.034)	.117** (.029)
Unmarried female head became married	.015 (.028)	-.051+ (.029)	-.071 (.053)	.046+ (.027)	.048** (.017)	.010 (.012)	.091** (.040)	-.025 (.034)
Splitoff, unmarried male head in 1976	-.036+ (.021)	-.054* (.022)	-.039 (.041)	.040+ (.021)	.024+ (.013)	-.004 (.009)	.079** (.030)	.000 (.026)
Splitoff, unmarried female head in 1976	.017 (.020)	.049* (.021)	-.088* (.038)	.106** (.020)	-.001 (.012)	.016+ (.009)	.164** (.029)	.0848* (.025)
Change in number of children age 0-17	.0040 (.0101)	-.0028 (.0105)	-.0247 (.0192)	.022* (.010)	.0130* (.0060)	-.0064 (.0044)	-.0186 (.0143)	.033** (.012)
Lost children, age 0-6	.029 (.025)	.029 (.026)	-.058 (.048)	.037 (.025)	.006 (.015)	-.001 (.011)	.033 (.036)	-.058+ (.031)
Gained children, age 0-6	-.012 (.025)	-.035 (.026)	.086+ (.047)	.080** (.024)	-.010 (.015)	.003 (.011)	.130** (.035)	-.074* (.030)
Always had children, age 0-6	-.022 (.030)	.056+ (.031)	.020 (.057)	-.082** (.029)	-.013 (.018)	.095** (.013)	-.001 (.042)	-.022 (.037)
R2=	.006	.018	.042	.096	.051	.080	.059	.052

Table A5.8 (page 3 of 3)

Independent Variable	Part-time to Full-time	Always Part-time	Part-time to No Work	No Work to Full-time	No Work to Part-time	Remained Not Working
Whether black	-.004 (.026)	.018 (.016)	.018 (.014)	.018 (.021)	.006 (.016)	.037+ (.021)
Age of 1976 head	-.0007 (.0007)	-.0002 (.0004)	.0001 (.0004)	-.0009 (.0006)	.0003 (.0004)	.0128** (.0006)
Education of 1976 head	.0037 (.0037)	.0030 (.0022)	-.0023 (.0019)	.0039 (.0030)	.0024 (.0022)	-.0158** (.0030)
Number of children age 0-17 in 1973	.0075 (.0117)	.0095 (.0070)	.0031 (.0062)	-.0083 (.0096)	-.0073 (.0071)	-.0445** (.0096)
Divorced, widowed female	-.044 (.028)	-.001 (.017)	.020 (.015)	.037 (.023)	.001 (.017)	-.023 (.023)
Unmarried female head became married	.040 (.033)	.008 (.020)	-.013 (.018)	.076** (.027)	-.012 (.020)	-.094** (.027)
Splitoff, unmarried male head in 1976	.032 (.026)	.009 (.015)	-.010 (.014)	-.003 (.021)	.010 (.015)	.057** (.021)
Splitoff, unmarried female head in 1976	-.015 (.024)	-.012 (.014)	.018 (.013)	.003 (.020)	-.006 (.015)	.034+ (.020)
Change in number of children age 0-17	.0133 (.0120)	.0128+ (.0072)	.0022 (.0064)	-.0047 (.0099)	-.0094 (.0073)	-.0463** (.0099)
Lost children, age 0-6	-.014 (.030)	-.005 (.018)	-.024 (.016)	-.014 (.025)	.008 (.018)	-.043+ (.025)
Gained children, age 0-6	-.033 (.029)	-.044* (.018)	.010 (.016)	-.011 (.024)	-.002 (.018)	.051* (.024)
Always had children, age 0-6	-.026 (.036)	-.040+ (.021)	-.024 (.019)	-.015 (.029)	.042+ (.022)	.104** 9.029)
R^2=	.011	.003	.008	.004	-.001	.492

Significance Tests:

**.01   *.05   +.10

Table A5.9 (page 1 of 3)

REGRESSIONS WITH QUITTING THE FOOD STAMP PROGRAM AS THE DEPENDENT VARIABLE

(Same Head, N = 641; Mean = .492)

Independent Variable	(1)	(2)	(3)	(4)
Background Variables				
Whether black	-.093*	-.029	-.018	-.026
	(.041)	(.040)	(.040)	(.036)
Age of 1976 head	-.0007	-.0004	-.0025*	-.0002
	(.0014)	(.0013)	(.0014)	(.0015)
Education of 1976 head	.0179*	.0233**	.0252**	.0091
	(.0072)	(.0069)	(.0069)	(.0068)
Number of children age 0-17 in household in 1973	-.0250**	-.367**	-.0365**	-.0262
	(.0091)	(.0091)	(.0018)	(.0113)
R2=	.035			
Family Composition Change				
(Married couple in both 1973 and 1976)		--	--	--
Divorced, widowed male		-.030	-.089	-.026
		(.099)	(.102)	(.093)
Unmarried male head in 1973 and 1976		-.779**	-.852**	-.849**
		(.172)	(.172)	(.160)
Unmarried male head in 1973 and 1976		.160+	.078	.156+
		(.094)	(.096)	(.088)
Unmarried female head in 1973 and 1976		-.2866**	-.310	-.0998
		(.041)	(.042)	(.044)
		R2= .136		

Table A5.9 (page 2 of 3)

Independent Variables	(3)	(4)
Changes in Children		
Change in number of children Age 0-17	-.0206 (.0261)	-.0228 (.0241)
(No children age 6 or less in 1973 and 1976)	--	--
Lost children age 0-6	-.039 (.070)	-.021 (.064)
Gained children age 0-6	-.191 (.082)	-.076 (.076)
Had children age 0-6 in both 1973 and 1976	-.154** (.057)	-.055 (.053)
R2=	.149	
Intervening Change Variables		
Change in head's illness weeks		-.0054* (.0024)
Change in head's unemployment strike weeks		(.0006) (.0016)
Change in wife's work weeks		.0008 (.0016)
Change in rent ($10)		-.0015 (.0032)
Change in head's wage		-.0058 (.0057)
(Head never disabled)		--
Head became able		-.109* (.055)
Head became disabled		.039 (.063)
Head always disabled		-.095 (.060)

Table A5.9 (page 3 of 3)

Independent Variables	(4)
(Always urban)	--
Urban to rural	-.173 (.140)
Rural to urban	-.032 (.117)
Always rural	-.092* (.043)
(Never AFDC)	--
Became AFDC	-.406** (.091)
Quit AFDC	.086+ (.045)
Always AFDC	-.277** (.057)
(Always employed)	--
Full-time to part-time	.027 (.090)
Full-time to no work	-.134 (.105)
Part-time to full-time	.127+ (.070)
Always part-time	-.265** (.091)
Part-time to no work	-.105 (.089)
Unemployed to full-time	.107 (.084)
Unemployed to part-time	.029 (.116)
Remained unemployed	-.230** (.066) R^2=.349

Significance Tests:
**.01 *.05 +.10

Table A5.10

REGRESSIONS OF FAMILY COMPOSITION CHANGE ON DEMOGRAPHIC VARIABLES QUITTING FOOD STAMP PROGRAM
(Same Head)

Demographic Variables	Divorced, Widowed Male	Unmarried Male Head Became Married	Unmarried Male Head in 1973 and 1976	Unmarried Female Head in 1973 and 1976
Whether black	-.033**	-.012	.021	.269**
	(.016)	(.009)	(.017)	(.040)
Age of 1976 head	.0006	-.0004	-.0007	.0016
	(.0005)	(.0003)	(.0006)	(.0014)
Education of 1976 head	.0061*	.0015	.0014	.0150*
	(.0028)	(.0016)	(.0030)	(.0070)
Number of children age 0-17 in 1973	-.0042	-.0054**	-.0170**	-.0353**
	(.0035)	(.0020)	(.0038)	(.0089)
R^2=	.013	.016	.026	.082

Significance Tests:

**.01 *.05 +.10

Table A5.11

REGRESSIONS WITH CHANGE IN CHILDREN AS THE DEPENDENT VARIABLE QUITTING THE FOOD STAMP PROGRAM
(Same Head)

Independent Variable	Change in Number of Children, 0-17	Whether Lost Children Age 0-6	Whether Gained Children Age 0-6	Whether Always Had Children Age 0-6
Whether black	.094 (.067)	.012 (.024)	-.015 (.022)	.075* (.033)
Age of 1976 head	-.0113** (.0022)	-.0010** (.0008)	-.0024** (.0007)	-.0090** (.0011)
Education of 1976 head	.0343** (.0115)	-.0110** (.0042)	.0064+ (.0037)	.0025 (.0056)
Number of children age 0-17 in 1973	-.2505** (.0151)	.0234** (.0055)	-.0174** (.0049)	.0510* (.0074)
(Married couple in 1973 and 1976)	-	-	-	-
Divorced, widowed male	-.926** (.166)	.254** (.060)	-.107* (.054)	-.192* (.081)
Unmarried male head became married	-.287 (.287)	.020 (.104)	-.065 (.093)	-.365** (.141)
Unmarried male head in 1973 and 1976	-.439** (.157)	.063 (.057)	-.119* (.051)	-.338** (.077)
Unmarried female head in 1973 and 1976	-.264** (.069)	.067** (.025)	-.000 (.022)	-.140** (.034)
R2	.331	.051	.055	.320

Significance Tests:

**.01 *.05 +.10

Table A5.12 (page 1 of 3)

REGRESSIONS WITH INTERVENING CHANGE VARIABLES AS THE DEPENDENT VARIABLE QUITTING THE FOOD STAMP PROGRAM
(Same Head)

Independent Variable	Change in Head's Illness Weeks	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage Rate	Head Became Able	Head Became Disabled	Head Always Disabled
Whether black	2.173** (.642)	1.559 (1.001)	1.147 (.941)	-.380 (.474)	.367 (.266)	-.037 (.030)	.069** (.025)	.005 (.029)
Age of 1976 head	.0324 (.0231)	.0084 (.036)	-.0362 (.0339)	-.0046 (.0171)	-.0345** (.0096)	.0023 (.0011)	.0003 (.0009)	.0029** (.0010)
Education of 1976 head	.2468* (.1106)	-.1650 (.1725)	-.2493 (.1623)	.0668 (.0817)	-.0743 (.0458)	-.0147** (.0051)	-.0117** (.0042)	-.0120* (.0049)
Number of children age 0-17 in 1973	.4964** (.1890)	.2687 (.2949)	-.3064 (.2774)	.0816 (.1397)	-.1112 (.0783)	-.0175* (.0087)	.0012 (.0072)	-.0224** (.0084)
Divorced, widowed male	1.332 (1.627)	3.169 (2.538)	-9.859** (2.386)	2.087* (1.202)	.303 (.673)	-.142* (.075)	-.045 (.062)	.259** (.072)
Unmarried male head became marrried	-.009 (2.750)	.593 (4.291)	19.705** (4.035)	7.993** (2.032)	.577 (1.139)	.170 (.127)	.004 (.105)	.246* (.122)
Unmarried male head in 1973 and 1976	-1.987 (1.530)	5.563* (2.387)	-2.250 (2.245)	-1.273 (1.131)	-.844 (.633)	.338** (.071)	.043 (.059)	-.061 (.068)
Unmarried female head in 1973 and 1976	-.578 (.671)	3.059** (1.046)	-2.174* (.984)	.508 (.496)	.016 (.278)	.029 (.031)	.039 (.026)	.000 (.030)
Change in number of children age 0-17	1.706* (.418)	1.379* (.652)	-.0570 (.6131)	.368 (.309)	.1733 (.1730)	-.0389* (.0192)	.0024 (.0160)	-.0447* (.0186)
Lost children, age 0-6	-.141 (1.119)	2.885* (1.746)	-4.353** (1.642)	.405 (.827)	-.267 (.463)	-.037 (.052)	-.048 (.043)	-.062 (.050)
Gained children, age 0-6	-4.384** (1.307)	-2.964 (2.040)	2.1 (1.918)	-1.163 (.966)	1.188* (.541)	.056 (.060)	-.026 (.050)	.075 (.058)
Always had children, age 0-6	-2.651** (.908)	-6.509** (1.417)	.786 (1.333)	.626 (.671)	-.538 (.376)	.002 (.042)	-.071* (.035)	.045 (.040)
R^2=	.046	.092	.087	.029	.039	.110	.050	.098

Table A5.12 (page 2 of 3)

Independent Variable	Urban to Rural	Rural to Urban	Always Rural	Became AFDC Recipient	Quit AFDC	Always AFDC Recipient	Full-time Work to Part-time Work	Full-time Work to No Work
Whether black	.001 (.011)	-.008 (.012)	-.096** (.034)	-.006 (.018)	-.013 (.039)	.018 (.034)	.032+ (.018)	.025+ (.015)
Age of 1976 head	.0002 (.0004)	.0012** (.0004)	.0009 (.0012)	-.0003 (.0006)	.0000 (.0014)	-.0041** (.0012)	.0001 (.0006)	.0008 (.0005)
Education of 1976 head	-.0013 (.0019)	.0066** (.0021)	-.0402** (.0058)	-.001 (.0030)	-.0033 (.0067)	-.0234** (.0059)	-.0013 (.0030)	.0033 (.0025)
Number of children age 0-17 in 1973	-.0047 (.0032)	-.0028 (.0036)	-.0214* (.0099)	-.0124* (.0051)	-.0380** (.0114)	.0575** (.0100)	.0258** (.0052)	-.0076+ (.0043)
Divorced, widowed male	-.008 (.028)	.028 (.031)	-.135 (.086)	-.061 (.044)	-.108 (.098)	.152+ (.087)	.083+ (.046)	-.075* (.037)
Unmarried male head became married	-.015 (.047)	-.028 (.052)	-.230 (.146)	-.035 (.075)	-.110 (.165)	.091 (.146)	-.033 (.075)	-.058 (.063)
Unmarried male head in 1973 and 1976	-.008 (.026)	-.018 (.029)	-.197* (.080)	-.032 (.042)	-.055 (.092)	.066 (.081)	-.055 (.042)	-.053 (.035)
Unmarried female head in 1973 and 1976	.014 (.011)	-.012 (.013)	-.108** (.035)	-.001 (.018)	-.092* (.040)	.372** (.036)	-.054** (.018)	-.051** (.015)
Change in number of children age 0-17	.0046 (.0071)	.0052 (.0080)	-.0822** (.0220)	-.0331** (.0114)	-.0372 (.0251)	.0444* (.0222)	.0221* (.0114)	-.0036 (.0095)
Lost children age 0-6	.034+ (.019)	.036+ (.021)	-.140* (.059)	.027 (.031)	.014 (.067)	.051 (.060)	-.008 (.031)	.043+ (.026)
Gained children, age 0-6	.099** (.022)	.056* (.025)	.053 (.069)	.095** (.036)	.076 (.079)	.125+ (.070)	-.050 (.036)	-.021 (.030)
Always had children, age 0-6	.008 (.016)	.036* (.017)	.008 (.048)	.070** (.025)	-.086 (.055)	.178** (.048)	-.056* (.025)	.009 (.021)
R2=	.040	.022	.190	.012	.028	.269	.065	.014

Table A5.12 (page 3 of 3)

Independent Variable	Part-time to Full-time	Always Part-time	Part-time to No Work	No Work to Full-time	No Work to Part-time	Remained Not Working
Whether black	-.026 (.025)	-.007 (.017)	-.022 (.020)	.013 (.020)	-.002 (.013)	-.036 (.034)
Age of 1976 head	-.0038** (.0009)	-.0014* (.0006)	-.0016* (.0007)	-.0037** (.0007)	-.0003 (.0005)	.0122** (.0012)
Education of 1976 head	.0072+ (.0042)	.0069* (.0030)	-.0126** (.0034)	-.0005 (.0035)	-.0001 (.0023)	-.0213** (.0059)
Number of children age 0-17 in 1973	-.0135+ (.0072)	.0058 (.0051)	-.0040 (.0059)	-.0125* (.0059)	.0119** (.0039)	-.0029 (.0100)
Divorced, widowed male	.018 (.062)	-.035 (.044)	-.058 (.050)	-.093+ (.051)	.003 (.033)	.179* (.086)
Unmarried male head became married	-.150 (.105)	-.071 (.075)	-.072 (.085)	.375** (.086)	-.003 (.057)	.088 (.146)
Unmarried male head in 1973 and 1976	-.028 (.058)	.144** (.042)	.051 (.047)	-.037 (.048)	-.001 (.031)	.139+ (.081)
Unmarried female head in 1973 and 197	-.108** (.026)	.031+ (.018)	-.019 (.021)	-.023 (.021)	.019 (.014)	.402** (.036)
Change in number of children age 0-17	-.0065 (.0160)	-.0094 (.0114)	-.0075 (.0129)	-.0263* (.0131)	.0118 (.0086)	.0085 (.0222)
Lost children, age 0-6	-.052 (.430)	-.072* (.030)	-.027 (.035)	-.039 (.350)	-.023 (.023)	.054 (.590)
Gained children, age 0-6	-.012 (.050)	-.002 (.036)	.038 (.041)	-.016 (.042)	-.016 (.027)	.103 (.069)
Always had children, age 0-6	-.011 (.035)	-.081** (.025)	-.010 (.028)	-.035 (.028)	-.004 (.019)	.132** (.048)
R2=	.097	.063	.019	.083	.010	.382

Significance Tests:
**.01 *.05 +.10

Table A5.13

REGRESSIONS WITH QUITTING FOOD STAMPS AS DEPENDENT VARIABLE
(Different Head, N = 194; Mean = .564)

Independent Variables	(1)	(2)	(3)	(4)
Demographic Variables				
Whether black	.055 (.077)	.043 (.073)	.071 (.073)	.096 (.075)
Age of 1976 head	-.0047+ (.0025)	-.0005 (.0028)	-.0051 (.0033)	-.0062+ (.0037)
Education of 1976 head	.0172 (.0112)	.0086 (.0110)	.0057 (.0109)	-.0072 (.0118)
Number of children age 0-17 in 1973	-.0276 (.0179)	-.0067 (.0179)	-.0061 (.0323)	.0061 (.0334)
R2=	.055			
Family Composition Change				
(Splitoff, married couple in 1976)		-	-	-
Divorced, widowed female		-.284* (.119)	-.289* (.136)	-.004 (.147)
Unmarried female head became married		.059 (.135)	.064 (.154)	.059 (.166)
Splitoff, unmarried male head in 1976		.195 (.130)	-.033 (.158)	-.107 (.165)
Splitoff, unmarried female head in 1976		-.261* (.119)	-.332** (.125)	-.141 (.139)
R^2=		.142		

Table A5.13 (page 2 of 3)

Independent Variables	(3)	(4)
Change in Children		
Change in number of children age 0-17	-.0128 (.0365)	-.0137 (.0368)
(No children age 6 or less in 1973 and 1976)	-	-
Lost children age 0-6	-.278* (.119)	-.080 (.123)
Gained children age 0-6	-.330* (.141)	-.101 (.136)
Had children age 0-6 in both 1973 and 1976	-.212+ (.130)	.020 (.132)
R^2=	.165	
Intervening Change Variables		
Change in head's illness weeks		-.0063 (.0048)
Change in head's unemployment strike weeks		-.0019 (.0031)
Change in wife's work weeks		.0002 (.0024)
Change in rent ($10)		-.0012 (.0055)
Change in head's wage		.0541** (.0183)
(Head never disabled)		-
Head became able		.013 (.087)
Head became disabled		.264 (.163)
Head always disabled		-.301+ (.163)

Table A5.13 (page 3 of 3)

Independent Variables	(4)
(Always urban)	-
Urban to rural	.096 (.162)
Rural to urban	-.023 (.280)
Always rural	-.158+ (.083)
(Never AFDC)	-
Became AFDC	-.657** (.170)
Quit AFDC	-.034 (.102)
Always AFDC	-.453** (.124)
(Always employed)	-
Full-time to part-time	-.334+ (.198)
Full-time to unemployed	-.421* (.196)
Part-time to full-time	-.198 (.150)
Always part-time	.046 (.208)
Part-time to unemployed	-.319+ (.177)
Unemployed to full-time	-.234+ (.135)
Unemployed to part-time	-.303* (.141)
Remained unemployed	-.263+ (.143)
R2=	.356

Significance Levels:

**.01 *.05 .10

Table A5.14

REGRESSIONS OF FAMILY COMPOSITION CHANGE ON DEMOGRAPHIC VARIABLES; QUITTING FOOD STAMPS
(Different Head)

Demographic Variable	Divorced, Widowed Female	Female Head Became Married	Splitoff, Unmarried Male Head	Splitoff Unmarried Female Head
Whether black	-.029 (.057)	.047 (.049)	-.010 (.052)	-.011 (.060)
Age of 1976 head	.0164** (.0019)	-.0030+ (.0016)	-.0037* (.0017)	-.0053** (.0020)
Education of 1976 head	-.0122 (.0086)	.0026 (.0072)	.0207** (.0077)	-.0034 (.0088)
Number of children age 0-17 in 1973	.0161 (.0137)	-.0332** (.0115)	-.0116 (.0122)	.0462** (.0140)
R2=	.436	.041	.105	.140

Significance Tests:
**.01 *.05 +.10

Table A5.15

REGRESSIONS WITH CHANGE IN CHILDREN AS DEPENDENT VARIABLE
QUITTING THE FOOD STAMP PROGRAM
(Different Head)

Independent Variable	Change in Number of Children, 0-17	Whether Lost Children Age 0-6	Whether Gained Children, Age 0-6	Whether Always Had Children, Age 0-6
Whether black	.233 (.159)	.026 (.052)	.057 (.048)	-.006 (.058)
Age of 1976 head	-.0275** (.0062)	-.0004 (.0020)	-.0063** (.0018)	-.0094** (.0022)
Education of 1976 head	.0251 (.0239)	-.0044 (.0078)	-.0067 (.0071)	.0007 (.0087)
Number of children age 0-17 in 1973	-.6778** (.0390)	.0331** (.0127)	-.0262* (.0116)	.0411** (.0142)
Divorced, widowed female	1.440** (.259)	.162+ (.084)	-.376** (.077)	.264** (.095)
Unmarried female head became married	1.478** (.295)	.094 (.096)	-.483** (.088)	.566** (.108)
Splitoff, unmarried male head in 1976	-1.250** (.283)	.093 (.092)	-.566** (.084)	-.241* (.103)
Splitoff, unmarried female head in 1976	-.469+ (.260)	.021 (.085)	-.345** (.078)	.203* (.095)
R2	.750	.030	.271	.345

Significance Tests:
**.01 *.05 +.10

Table A5.16 (page 1 of 3)

REGRESSIONS WITH INTERVENING CHANGE VARIABLES AS THE DEPENDENT VARIABLE QUITTING THE FOOD STAMP PROGRAM

(Different Head)

Independent Variable	Head's Illness Weeks	Change in Head's Unemployment Weeks	Change in Wife's Work Weeks	Change in Rent	Change in Head's Wage Rate	Head Became Able	Head Became Disabled	Head Always Disabled
Whether black	2.106+	.624	6.692**	.041	.277	.026	.010	.037
	(1.093)	(1.753)	(2.485)	(1.015)	(.391)	(.067)	(.035)	(.034)
Age of 1976 head	.0492	.2298**	.1368	-.0067	.0033	.0071*	-.0038*	.0047**
	(.0498)	(.0799)	(.1132)	(.0462)	(.0178)	(.0030)	(.0016)	(.0016)
Education of 1976 head	-.1197	.3750	.5669	.3039*	-.0056	-.0086	.0009	-.0183**
	(.1639)	(.2630)	(.3728)	(.1523)	(.0587)	(.0100)	(.0052)	(.0051)
Number of children age 0-17 in 1973	.3665	2.089	-.5184	.5007	-.1294	-.0007	-.0130	-.0116
	(.4841)	(.777)	(1.1011)	(.4499)	(.1734)	(.0296)	(.0154)	(.0152)
Divorced, widowed female	-4.755**	-6.234+	-6.339	-.995	-.876	-.279*	.125+	-.026
	(2.030)	(3.258)	(4.617)	(1.886)	(.727)	(.124)	(.065)	(.064)
Unmarried female head became married	-3.452	-15.495**	8.396	-3.001	1.395	-.276*	-.129+	-.010
	(2.306)	(3.701)	(5.246)	(2.143)	(.826)	(.141)	(.073)	(.072)
Splitoff, unmarried male head in 1976	-1.284	3.755	-4.450	8.561**	2.625**	-.228	-.056	.069
	(2.370)	(3.804)	(5.392)	(2.203)	(.849)	(.145)	(.075)	(.074)
Splitoff, unmarried female head in 1976	-3.427+	4.118	-5.143	.478	.537	.180	-.092	-.044
	(1.871)	(3.002)	(4.255)	(1.738)	(.670)	(.114)	(.059)	(.059)
Change in number of children age 0-17	1.132*	1.392	-.1332	-.1847	.1598	.0310	.0039	-.0194
	(.546)	(.877)	(1.242)	(.5075)	(.1956)	(.0334)	(.0173)	(.0171)
Lost children, age 0-6	.970	-4.565	-.313	-3.798*	-.096	-.205+	.154**	.237**
	(1.781)	(2.858)	(4.051)	(1.655)	(.638)	(.109)	(.057)	(.056)
Gained children, age 0-6	2.614	-2.792	-3.947	3.451+	-.218	-.105	.036	.111+
	(2.111)	(3.388)	(4.802)	(1.962)	(.756)	(.129)	(.067)	(.066)
Always had children, age 0-6	-1.731	-3.628	-1.885	5.396**	-.761	-.172	.110+	.135*
	(1.945)	(3.121)	(4.423)	(1.807)	(.696)	(.119)	(.062)	(.061)
R^2=	.092	.227	.071	.309	.173	.166	.138	.225

TABLE A5.16 (page 2 of 3)

Independent Variables	Urban to Rural	Rural to Urban	Always Rural	Became AFDC	Quit AFDC	Always AFDC	Full-time to Part-time	Full-time to No Work
Whether black	-.123** (.035)	-.015 (.019)	-.068 (.068)	.014 (.033)	.115+ (.069)	-.015 (.059)	.033 (.029)	.014 (.031)
Age of 1976 head	.0035* (.0016)	-.0009 (.0008)	.0047 (.0031)	-.0045** (.0015)	.0014 (.0031)	-.0040 (.0027)	-.0003 (.0013)	.0002 (.0014)
Education of 1976 head	.0113* (.0052)	-.0024 (.0028)	.0067 (.0102)	-.0042 (.0049)	-.0274** (.0103)	-.0138 (.0089)	.0055 (.0043)	-.0035 (.0046)
Number of children age 0-17 in 1973	.0208 (.0153)	-.0059 (.0082)	-.0150 (.0302)	-.0074 (.0144)	.0162 (.305)	.0229 (.0262)	.0529** (.0127)	-.0016 (.0136)
Divorced, widowed female	-.086 (.064)	-.000 (.034)	.029 (.127)	.242** (.061)	-.230+ (.128)	.204+ (.110)	.012 (.053)	-.022 (.057)
Unmarried female head became married	.011 (.073)	.068+ (.039)	.246+ (.144)	.050 (.069)	.282* (.145)	.011 (.125)	.002 (.060)	-.051 (.065)
Splitoff, unmarried male head in 1976	.150* (.075)	.014 (.040)	-.229 (.148)	.227* (.071)	-.090 (.149)	.088 (.128)	-.033 (.062)	-.025 (.067)
Splitoff, unmarried female head in 1976	.145* (.059)	-.010 (.032)	-.149 (.117)	.149** (.056)	-.078 (.118)	.273** (.101)	-.032 (.049)	-.009 (.053)
Change in number of children age 0-17	.0194 (.0172)	-.0018 (.0092)	-.0346 (.0340)	.0163 (.1189)	-.0413 (.0344)	.0309 (.0296)	.0439** (.0143)	-.0124 (.0153)
Lost children, age 0-6	-.022 (.056)	-.002 (.030)	.135 (.111)	-.022 (.053)	-.105 (.112)	.341** (.096)	.026 (.047)	-.020 (.050)
Gained children, age 0-6	.106 (.067)	.001 (.036)	.122 (.132)	.212** (.063)	-.116 (.133)	.075 (.114)	-.087 (.055)	.033 (.059)
Always had children, age 0-6	-.0[illegible] ([illegible])	.019 (.033)	.100 (.121)	.014 (.058)	-.088 (.123)	.322** (.105)	-.080 (.051)	.048 (.055)
R2=	.155	.008	.081	.183	.114	.243	.122	-.024

Table A5.16 (page 3 of 3)

Independent Variable	Part-time to Full-time	Always Part-time	Part-time to No Work	No Work to Full-time	No Work to Part-time	Remained Not Working
Whether black	-.121* (.048)	.031 (.028)	-.118** (.041)	.178** (.051)	.059 (.046)	-.005 (.058)
Age of 1976 head	-.0062** (.0021)	-.0002 (.0013)	-.0041* (.0018)	-.0007 (.0023)	-.0009 (.0021)	.0122** (.0026)
Education of 1976 head	.0063 (.0070)	.0021 (.0041)	.0145* (.0061)	.0114 (.0076)	.0069 (.0068)	-.0331** (.0087)
Number of children age 0-17 in 1973	-.0018 (.0208)	-.0159 (.0122)	.0260 (.0180)	-.0107 (.0225)	-.0429* (.0202)	-.0464+ (.0256)
Divorced, widowed female	.154+ (.087)	.104* (.051)	.126+ (.076)	-.385** (.095)	.120 (.085)	.199+ (.108)
Unmarried female head became married	.199* (.099)	.059 (.058)	-.083 (.086)	-.316** (.107)	.327** (.096)	-.040 (.122)
Splitoff, unmarried male head in 1976	-.076 (.102)	.038 (.060)	-.128 (.088)	-.292** (.110)	.132 (.099)	.237+ (.126)
Splitoff, unmarried female head in 1976	-.058 (.080)	.094* (.047)	.058 (.070)	-.285** (.087)	.039 (.078)	.424** (.099)
Change in number of children age 0-17	-.0476* (.0234)	-.0117 (.0138)	.0345+ (.0203)	-.0039 (.0254)	-.0366 (.0228)	-.0317 (.0289)
Lost children, age 0-6	-.178* (.076)	-.038 (.045)	.049 (.066)	-.069 (.083)	-.032 (.074)	.190* (.094)
Gained children, age 0-6	.002 (.091)	.072 (.053)	-.103 (.079)	-.049 (.098)	.050 (.088)	.172 (.112)
Always had children, age 0-6	-.121 (.083)	-.024 (.049)	-.090 (.072)	-.114 (.091)	.033 (.081)	.343** (.103)
R^2=	.108	.005	.133	.200	.072	.417

Significance tests:
**.01 *.05 +.10

Chapter 6

MEASUREMENT ERROR IN STATUS ATTAINMENT MODELS

Mary Corcoran

INTRODUCTION

Empirical studies of economic mobility typically estimate a man's current status as a function of his parents' socioeconomic status and of his own subsequent achievements (Blau and Duncan, 1967; Jencks et al., 1972). Parental socioeconomic status is measured by asking sons to recollect parental traits such as father's education or number of siblings, but such retrospective measures might be subject to error. It has been pointed out that failing to correct for measurement error in background variables could lead one to underestimate the extent to which economic outcomes depend on social origins, to overestimate the influence of education on economic outcomes, and to distort the relative importance of particular background variables (Bowles, 1972; Bowles and Nelson, 1974; Mason et al., 1976).[1]

Several researchers have attempted to adjust structural equations models for measurement error in men's reports of their parents' characteristics and have often come to quite different conclusions. Jencks et al. (1972) concluded that failing to correct for random measurement error led to modest underestimates of the overall effect of background on achievement; Bowles and Nelson (1974) corrected for both random measurement error and within-variable correlated error and found that such corrections substantially increased the overall explanatory power of background as a determinant of individual achievement.

Past attempts to investigate measurement error in retrospective background reports have been constrained by inadequate data and/or models. Only two researchers have separate measures of parental variables from two different observers (Mason et al., 1976; Borus and Nestel, 1973). Neither of these studies provided retrospective information since in both samples the sons were young and living at home, and reports from both fathers and sons were obtained within several months of one another. In addition, Borus and Nestel assumed that fathers' reports were correct and did not test competing models of response error. As Mason's results indicated, this assumption is not always justified.

---

[1] Mason et al. concentrated in their analysis on how errors in children's and youths' reports of parental statuses affected estimates of the early status attainment process.

Bielby, Hauser, and Featherman (1977a) have conducted perhaps the most extensive published investigation so far of measurement error using the remeasurement subsample of the 1973 Occupational Changes in a Generation (OCG) replication (N=926: 578 whites and 348 blacks). This subsample was a nationally representative sample of U. S. men who were 20 to 64 years of age in 1973. For each sample member, measures of family background traits, education, first occupation, and current occupation were obtained on two separate occasions.[2] In addition, a third measure of schooling had been obtained prior to the 1973 OCG survey. Bielby tested for two kinds of correlated measurement error in family background: first to see whether errors in reports of different characteristics at a point in time were correlated (within-occasion error), and then to see if errors in reports of the same characteristic obtained at different times were correlated (within-variable error). This latter error seems likely to occur in retrospective reports. If sons misremember parental traits, then their reports over time are likely to be consistent but incorrect. We need three reports of an observed characteristic to fully test for this type of error, two by one observer and a third by a second observer. The Bielby analysis is limited since this was true only for men's schooling.[3] To identify within-variable error correlations, the study specified that the correlations between errors in reports of characteristics obtained at different times were equal for all pairs of characteristics. Yet it is by no means clear why this assumption should hold. In fact, one can make a strong case against this assumption. If men consistently misreport a given variable over time because they are mistaken about its true value, then errors in reports of that variable will be correlated over time. It seems likely that men may be misinformed about the characteristics of their parents at some past date and so retrospective reports of these traits may be subject to nonrandom error. But men are less likely to be misinformed about their own current characteristics and so one might expect there to be less nonrandom error in men's reports of their own characteristics than in their reports of their parents' characteristics.

---

[2] Bielby's analysis is further complicated by the fact that on the first interview, about one quarter of the questionnaires were filled out by the respondent's spouse.

[3] This second observer was the respondent's spouse. Bielby had a measure of educational attainment from the March 1973 Current Population Survey (CPS). In about three-fourths of these interviews the spouse responded.

Bielby's conclusions were that retrospective reports of parental background by nonblack men are subject only to random measurement error, that parental status reported by sons is as reliable as is the sons' reports of their own current status, and that failing to control for measurement error neither substantially inflates estimates of the economic returns to schooling nor substantially underestimates effects of particular background variables on individual achievement. Bielby also found that failing to correct for measurement errors results in considerable underestimates of the proportion of variance in occupational status that is explained by background, but that this underestimate is as much due to errors in the measurement of the respondent's current occupation as to errors in his reports of parental characteristics. According to Bielby's figures, R^2's in the reduced-form equations of occupational status on background should increase by 22 percent if measurement error in background reports were eliminated.[4]

This chapter, by incorporating a second observer's reports of parental status into the measurement error model, extends Bielby's analysis of the extent to which measurement errors in retrospective reports of parental traits lead to biases in structural equation models of the intergenerational transmission of economic status. There are three main findings. First, young men's retrospective reports of parental status are considerably less reliable than are fathers' reports of their own status. This is contrary to Bielby's conclusions and suggests that Bielby's assumption of equal within-variable correlated error may be incorrect. Second, the overall effect of background on economic status increases when we adjust for measurement error. Third, there is no evidence that economic returns to schooling are overestimated when one fails to adjust for measurement error.

The Sample

The Panel Study of Income Dynamics is used to study the extent to which failing to control for measurement error affects results when estimating economic attainment models. The Panel Study is well suited for such an exploration since it follows families over time and takes separate interviews with children who leave home.

---

[4] In Bielby's analysis the R^2 in the reduced-form equation of occupation on background rose from .180 to .253 with adjustments for measurement errors in reports of occupation and of background variables. Since all measurement errors were random and the reliability of current occupation was .84, R^2 would increase from .18 to (.180/.84 = .214) because of measurement in current occupation. The remainder of the increase in R^2 (.253 - .214 = .029) can be attributed to measurement error in background reports. The ratio of .029 to .18 is .22.

This chapter explores the extent to which the education, occupation, and earnings of a young man are determined by his father's education and occupation and by his mother's education. The sample consisted of white employed men aged 23-30 in 1976 who headed their own households in 1976 and who were living with both parents in 1968. This age range was chosen because the majority of male children (more than 60 percent) leave home by age 23.[5] Since these young men have all left home within an eight-year period, they may report parental characteristics more accurately than do older men,[6] and this analysis was expected to provide a lower bound on the extent of retrospective error which would occur for men in a broader age range.[7] A respondent was dropped from the sample if:

1) his father failed to report his own education, his occupation, or his wife's education in 1968;
2) his mother was not interviewed in 1976;
3) the respondent did not report his father's education, his father's occupation, or his mother's education; or
4) the respondent reported zero labor income in 1976.

The final sample provided reports by the father and by the son of the father's occupation and education and by the father, son, and mother of the mother's education. Reports of parental education were originally coded into eight categories[8] and then were recoded into years of education by assigning midpoints. Measures of occupation were coded into one-digit Census categories and then assigned the mean Duncan score for those categories. Thus, the sample provided complete information for the following variables:

---

[5] Hill (1977) reports that only 26.3 percent of young men aged 23 in 1970 Census 1/1000 sample were living in households headed by one of their parents.

[6] Olneck, for instance, reported in a private communication that the correlations between brothers' reports of parental characteristics were higher for men under 45 than for men over 45 for a sample of approximately 200 brothers aged 35-59 and raised in Kalamazoo, Michigan.

[7] The reverse argument could also be made. Men who split off to head households at a young age may be more alienated from their parents than men of that age who remain at home. Since we look at young household heads, we may have a problem of selection bias. To test for this, the oldest half of this subsample was analyzed separately. Results were quite comparable to those obtained in the full analysis.

[8] These categories include:

1) 0-5 grades.
2) 6-8 grades, grade school.
3) 9-11 grades (some high school).
4) 12 grades (completed high school).

1) father's completed education in years as of 1968 as reported by the father in 1968 (ED_{f-f}).
2) father's occupation in 1968, as reported by father in 1968 (OCC_{f-f}).
3) mother's completed education as of 1968 as reported by father in 1968 (ED_{m-f}).
4) Mother's report of her education as of 1976 (ED_{m-m}).
5) son's report of his father's education (ED_{f-s}); son's report of his father's usual occupation while son was growing up (OCC_{f-s}); and son's report of mother's education (ED_{m-s}).
6) son's report of his own education (ED_{s-s}), occupation (OCC_{s-s}), and the natural logarithm of his hourly wage (LNWAGE) in 1976.

Table 6.1 describes how the various restrictions reduced the sample size and affected the weighted sample means and variances. By 1976, 383 white male sons aged 23-30 had left home; 316 (82.5 percent) of these men had lived with both their parents in 1968; 283 (73.9 percent) had fathers who reported their own education and occupation and their wife's education; 264 (68.9 percent) had a mother who was interviewed in 1976; 222 (58 percent) reported all three parental characteristics; and 219 (57.2 percent) reported an hourly wage.

The overall effect of sample restrictions was trivial; means and variances increased slightly. Not surprisingly, men who failed to report all background characteristics came from lower status backgrounds and worked in lower status and lower-paying jobs than those who supplied more complete information.[9]

This sample has both advantages and disadvantages relative to other populations used in the analysis of measurement error. On the plus side, it has an extremely rich set of indicators of parental status. We have parents' reports of their own characteristics and sons' reports of these characteristics. These reports were obtained at different times (at least one year apart). The sons were no longer living with their parents when they reported on parental traits.

---

5) 12 grades plus non-academic training.
6) Some college, no degree.
7) College, bachelors degree.
8) College, advanced or professional degree; some graduate work.

[9] This suggests that researchers who assign means for missing data on parental traits may be systematically overestimating the status background of non-reporters.

Table 6.1

EFFECTS OF SAMPLE RESTRICTIONS ON MEANS AND STANDARD DEVIATIONS[a] (Standard deviations are in parentheses).

(For all employed white men aged 23-30 in 1976 who were sons of a household head in 1967 and who splitoff to head their own household sometime between 1968 and 1976)

Sample[b] Limitations	N	Percentage	Son's Education	Son's Occupation in 1975 (Duncan Index)[c]	Son's Hourly Wage in 1976	Father's Occupation as Reported by Father in 1968 (Duncan Index)[c]	Father's Education as Reported by Father in 1968	Mother's Education as Reported by Father in 1968
	383	100.0	13.41 (2.29)	39.2 (21.6)	4.94 (2.11)	35.8 (20.1)	10.46 (3.60)	10.71 (2.89)
1	316	82.5	13.48 (2.27)	39.2 (21.5)	4.91 (2.10)	35.8 (20.1)	10.46 (3.60)	10.71 (2.89)
2	67	17.4	13.10 (2.33)	39.1 (22.2)	5.09 (2.14)	-	-	-
1, 3	283	73.9	13.57 (2.28)	39.8 (21.9)	4.91 (2.13)	35.4 (19.8)	10.59 (3.53)	10.78 (2.89)
1,3,4	264	68.9	13.77 (2.50)	39.7 (22.0)	4.82 (2.17)	35.8 (20.0)	10.61 (3.37)	10.89 (2.86)
1,3,4,5	222	58.0	13.84 (2.53)	40.8 (22.2)	4.94 (2.17)	36.9 (20.5)	10.70 (3.41)	10.94 (2.88)
1,3,4,6	42	11.0	13.33 (2.33)	33.7 (20.2)	4.52 (1.96)	30.0 (20.5)	10.32 (3.12)	10.82 (2.78)
1,3,4,5,7	219	57.2	13.90 (2.50)	41.1 (22.1)	4.94 (2.17)	37.2 (20.5)	10.80 (3.59)	10.98 (2.85)

[a] Whenever a variable has missing data, that case is omitted from calculations.

[b] 1 = All husband-wife households in 1967.
2 = All households without both a husband and wife in 1967.
3 = Father reported his own education and occupation and his wife's education in 1967.
4 = Wife in 1967 was interviewed in 1976 and reported her education (mothers who left the sample or died between 1968 and 1976 were dropped).
5 = Son reported father's education, father's occupation and mother's education.
6 = Son did not report at least one parental background characteristic.
7 = Son reported labor income.

[c] Occupations are coded into the eight broad Census categories and then transformed into Duncan scores.

And the fathers described their own characteristics during a period when the sons were still living at home. Second, the sample size is large enough to estimate a fairly detailed model with some precision. Third, the sample is old enough to have begun the first stages of the achievement process. Fourth, there is complete data on all the variables of interest. There may be a problem of sample representativeness. Young men's income is never as predictable as the income of older men. In addition, more than 40 percent of the sample was dropped because of missing data so that results may not be readily generalizable. But alternatives to excluding cases with missing data (e.g., use of pairwise correlations, assigning values) are equally limiting since they often involve dubious assumptions and are likely to misrepresent the true error structure.[10]

Sample Description

The averages of sons' and parents' reports of parental traits were similar (see Table 6.2, column 1), but sons' and parents' reports often disagreed. Only 64 percent of the son-father pairs agreed on the father's occupation (at the 1-digit Census category); only 61 percent agreed on the father's education; and only 71 percent of the mother-son pairs agreed on the mother's education.[11] Correlations between parents' and sons' reports of a given parental characteristic ranged between .77 and .80.[12] These correlations are lower than those reported by Mason or by Borus and Nestel; the latter found that 67 percent of their father-son pairs agreed on the father's occupation as coded into detailed Census categories and that the correlations between sons' and fathers'

---

[10] I decided to eliminate all cases with missing data on one or more variables of interest. There were other options. I could have used pairwise correlations or I could have assigned values to missing data. Any procedure involves problems. Bielby (1977a,b) mentions the following problems. Use of pairwise correlations assumes that these accurately reflect the correlations that would be present in the absence of missing data. Bielby used this procedure. Assigning means for missing data values reduces variances and error variances. Random assignment of missing data will reduce ability to find random errors; systematic assignment will have the opposite effect. Omitting missing data (the technique used in this chapter) reduced the sample size by 42 percent and perhaps selected out many of the less accurate responses. If this is true these analyses will underestimate the error in reports of background traits. See Griliches and Hall (1978) for an extensive discussion of these issues.

[11] Father's and mother's education are each coded into the eight categories listed in Footnote 8. Categories 4 and 5 are combined for comparison purposes.

[12] These correlations are computed as follows. Each report of parental education is assigned the midpoint in years of education of its category. One-digit occupational categories are converted to Duncan scores.

Table 6.2

MEANS ON BACKGROUND MEASURES
(Standard deviations are in parentheses)

(For all employed white men aged 23-30 in 1976, who lived
with their parents in 1968, whose parents reported their
own status traits, and who reported their parents' characteristics)

Reported By:	Father's Education	Father's Occupation	Mother's Education
Son at Time Split off	10.75 (3.39)	34.51 (19.36)	11.24 (2.81)
Father in 1968	10.80 (3.59)	37.15 (20.54)	10.98 (2.85)
Mother in 1976	-	-	10.94 (2.83)

reports of fathers' education and occupation were .95 and .89 respectively.[13] Mason obtained correlations (for whites) of .92, .89, and .84, respectively, between the reports by the fathers and by the 12th-grade sons of the father's education and occupation, and the mother's education. The discrepancy between these figures and the Panel Study figures is not surprising since in both the previous studies sons were living at home, and fathers' and sons' interviews were at most four months apart. The Panel Study correlations are similar to ones reported by Blau and Duncan (1967). Blau and Duncan selected 137 men whose fathers' records could be found in an earlier decennial Census and asked them to report on their father's occupation. About 70 percent of these responses matched at the one-digit level and 44 percent at the three-digit level for a correlation of .74.

Models

Figure 6.1 depicts the basic measurement models. These models can be described by the following 10 structural equations:

$$
\begin{array}{lllllll}
(1) & ED_{s-s} & = \alpha_1 + \beta_1\, ED_{f-t} & + \beta_2\, OCC_{f-t} & + \beta_3 ED_{m-t} & + \upsilon_1 \\
(2) & OCC_{s-s} & = \alpha_2 + \beta_4\, ED_{f-t} & + \beta_5\, OCC_{f-t} & + \beta_6 ED_{m-t} & + \upsilon_2 \\
(3) & LNWAGE & = \alpha_3 + \beta_7\, ED_{f-t} & + \beta_8\, OCC_{f-t} & + \beta_9 ED_{m-t} & + \upsilon_3 \\
(4) & ED_{f-f} & = \lambda_{1f}\, ED_{f-t} & & & + \varepsilon_{1f} \\
(5) & ED_{f-s} & = \lambda_{1s}\, ED_{f-t} & & & + \varepsilon_{1s} \\
(6) & OCC_{f-f} & = & \lambda_{2f}\, OCC_{f-t} & & + \varepsilon_{2f} \\
(7) & OCC_{f-s} & = & \lambda_{2s}\, OCC_{f-t} & & + \varepsilon_{2s} \\
(8) & ED_{m-f} & = & & \lambda_{3f} ED_{m-t} & + \varepsilon_{3f} \\
(9) & ED_{m-s} & = & & \lambda_{3s} ED_{m-t} & + \varepsilon_{3s} \\
(10) & ED_{m-m} & = & & \lambda_{3m} ED_{m-t} & + \varepsilon_{3m}
\end{array}
$$

where

ED i-j = the j'th person's report of the i'th person's education

OCC i-j = the Duncan score of the j'th person's report of the i'th person's occupation

LNWAGE = ln (hourly wage) of son in 1976

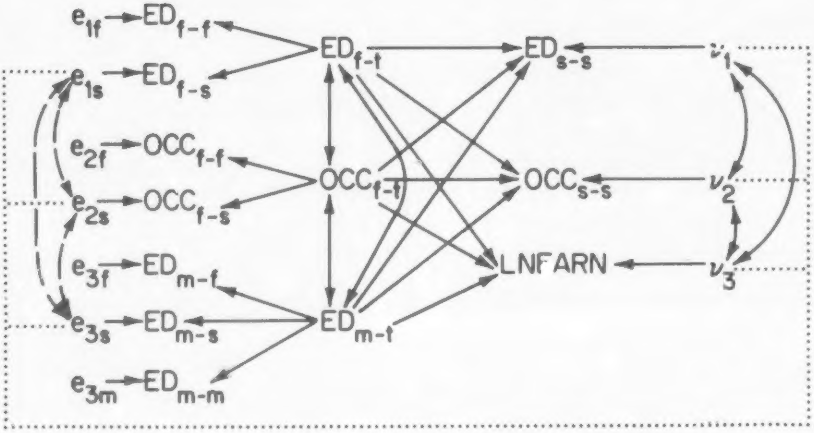
i, j = f for father
s for son
m for mother
t for true

---

[13] Both sets of correlations are quite high. Apparently young men who are living at home are well informed about their parents' status. In Mason's sample, these high correlations between parents' and sons' reports can not be attributed to consistency bias in coding or to interactions between parents and sons in the data collection since sons were interviewed in school and since parents' and sons' reports were coded separately.

FIGURE 6.1

MODELS OF MEASURMENT ERROR IN THE STATUS ATTAINMENT PROCESS


e1f
EDf-f
e1s
EDf-s
e2f
OCCf-f
e2s
OCCf-s
e3f
EDm-f
e3s
EDm-s
e3m
EDm-m
EDf-t
OCCf-t
EDm-t
EDs-s
OCCs-s
LNFARN
ν1
ν2
ν3

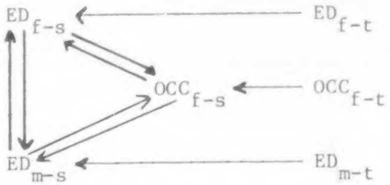
Model I = solid lines
Model II = solid lines plus dashed lines
Model III = solid lines plus dotted lines
Model IV = solid lines, dotted lines, and dashed lines

Equations 1 to 3 are the substantive portion of Figure 6.1; these are reduced-form equations of son's status attainment measures (education, occupational status, and ln hourly wage) on three background measures (father's education, father's occupation, and mother's education). Equations 4 through 10 are the measurement portion of Figure 6.1. These algebraic equations specify that the jth person's report of the kth parental status characteristic is generated by the true score of that characteristic times λ_{kj} plus a response error (ε_{kj}) that is independent of the true score. Sons' response errors might covary in at least three plausible ways:

1) Reporting errors might covary with the true scores. That is, men with low education may overstate their education while men with high education may understate their education. Such "floor and ceiling" effects occur when the slope coefficient λ_{kj} (in the population regression of the true score of the kth parental trait on the jth person's report of that trait) is not equal to 1.00.
2) Men might guess at one parental status characteristic based on their knowledge of other variables (see Mason et al., 1976, pp. 459-461). Or men may overstate the consistency in parental status characteristics (Bielby's within-occasion, between-variable correlated error). This should result in correlations between sons reporting errors (ε_{1s}, ε_{2s}, ε_{3s}) for the parental status measures,[14] as represented by the dashed lines in Figure 6.1.
3) A third possibility is that sons make their background reports consistent with their own status (as measured by schooling, ED_{s-s}, occupation, OCC_{s-s}, or hourly wages, LNWAGE).[15] If this were the

---

[14] If sons guess at one parental trait based on knowledge of other parental traits, this implies a simultaneous model of the form.



Such a model can not be identified with these data. But, if reciprocal causation were occurring, the response errors should be correlated.

[15] As above (Footnote 14), this model implies simultaneity and is not identified in these data. But, if this model were correct, sons' reporting errors should correlate with the disturbances of the endogenous variables.

case, then the errors in sons' reports of background traits (ε_{1s}, ε_{2s}, ε_{3s}) should covary with the stochastic disturbance terms (υ_1, υ_2, υ_3) of the reduced-form equations of status attainment on background. (See Mason, P. 461.) This type of error is represented by the dotted lines in Figure 6.1.

Other error patterns are possible. Fathers may overstate the consistency between their own and their wives' status characteristics. If this kind of error is incorporated into a model which also allows errors in the sons' reports to covary, the model will be underidentified. Since the purpose of this chapter is to investigate errors in mens' retrospective reports of parental traits, I have not investigated possible covariation between errors in fathers' reports of their own and their wives' status.[16] The other possible error patterns are less plausible. Men might overstate the consistency in their own status characteristics so that the errors in fathers' reports of their schooling and education might covary. Bielby investigated this type of nonrandom error in some detail and found no evidence of such error in his analysis. Sons' and parents' reports of parental traits might covary; but since reports are taken several years apart it is difficult to see how this would occur.

Estimation Procedure

To identify these models, the metric of unobserved parental characteristics were fixed to be the same as that of the parents' own reports of their characteristics. That is, $\lambda_{1f} = \lambda_{2f} = \lambda_{3m} = 1$.[17] The value of the other four λ_{kj}'s (λ_{1s}, λ_{2s}, λ_{3s}, λ_{3f}) remained to be estimated. This means we can not determine the absolute values of the λ_{kj}, we can only determine the relative values.

This chapter posits three models of measurement error, all of which permit the disturbance terms of the endogenous variables (υ_i) to be intercorrelated Model I allows only random measurement errors; the ε_{ij} are assumed to be uncorrelated with each other and with the υ_i. Model II allows for correlations between errors in sons' reports of different parental traits. This model tests whether sons overstate the consistency between parental status traits. The following correlations are estimated:

---

[16] It is impossible to allow for this kind of error in a model which also allows errors in sons' reports of parental status to covary and still have an identified structure. I did estimate a model which allows errors in fathers' reports of their own status to covary with errors in fathers' reports of their wives' schooling. This model provided a significantly better fit to the data than did a model which allowed only random error.

[17] In this model, we can only identify the values of the true score variances of the λ_{kj}'s relative to one another. Many researchers have estimated standardized models (this implicitly assigns variances of 1.00 to the unobserved characteristics); this procedure does not permit computation of nonstandardized coefficients. Error variances and reliabilities are invariant with respect to normalization, but true score variances and structural coefficients will depend on normalization. (Bielby, 1977a)

$r_{\varepsilon_{1s}, \varepsilon_{2s}}$; $r_{\varepsilon_{2s}, \varepsilon_{3s}}$; $r_{\varepsilon_{1s}, \varepsilon_{2s}}$.

Model III allows errors in sons' reports of their parents' status to covary with the stochastic disturbance terms of the endogenous variables. This tests whether men tend to make reports of parental traits consistent with their own status. Nine correlations are estimated:

$r_{\varepsilon_{1s}, \upsilon_1}$; $r_{\varepsilon_{2s}, \upsilon_1}$; $r_{\varepsilon_{3s}, \upsilon_1}$; $r_{\varepsilon_{1s}, \upsilon_2}$; $r_{\varepsilon_{2s}, \upsilon_2}$; $r_{\varepsilon_{3s}, \upsilon_2}$;

$r_{\varepsilon_{1s}, \upsilon_3}$; $r_{\varepsilon_{2s}, \upsilon_3}$; $r_{\varepsilon_{3s}, \upsilon_3}$.

Models I to III are each overidentified. We can allow for the free parameters in models II and III in a new model (Model IV) without the new model becoming underidentified, so that these models can be nested.[18] Joreskog's maximum likelihood estimation procedure allows one to evaluate competing models which are nested.

RESULTS

Choice of Model

Table 6.3 reports the likelihood ratio-tests for Models I, II, III and IV when they are estimated using Joreskog's general procedure for the analysis of covariance structures.[19] The likelihood-ratio test statistic evaluates how well a model reproduces the observed data (in this case, the variance-covariance matrix of sons' and fathers' reports). The difference in the likelihood-ratio tests associated with two nested models can be used to establish which of these two would best reproduce the observed data. This difference is distributed as a chi-square distribution with degrees of freedom equal to the number of parameters free in one model and fixed in the other. When the value of chi-square is

---

[18] Two models are nested if one can be obtained from the other by fixing some parameters in the other model.

[19] To do this, I assumed that the joint distribution of the ten observed measures was multivariate normal.

Table 6.3

CHI-SQUARE GOODNESS-OF-FIT TESTS FOR MEASUREMENT ERRORS MODELS

Model	χ^2	Degrees of Freedom	Probability
I. Random Measurement Errors in Sons' Reports of Parental Status	44.24	23	.005
II. Covariances among All Errors in Sons' Reports of Different Parental Status Characteristics	28.29	20	.103
III. Covariances of Errors in Sons' Reports of Parental Status Characteristics with the Stochastic Disturbances of the Endogenous Variables [Sons' Own Status Measures]	40.07	14	.000
IV. II and III	24.39	11	.011
V. Covariances between Errors in Sons' Reports of Fathers' and Mothers' Schooling	28.34	22	.165

significant, this means that the model with the most free parameters provides a significantly better "fit" to the data.

If we compare models I and II, we see that allowing sons' reporting errors of different parental traits to covary results in a chi-square of 15.95 (44.24 - 28.29) with three degrees of freedom; this improvement in fit is statistically significant. Further allowing sons' reporting errors to covary with the stochastic disturbances of the endogenous variables (Model IV) results in a clearly insignificant chi-square of 3.90 (28.29 - 24.39) with nine degrees of freedom; and in the individual maximum likelihood estimates of correlated error, all these nine covariances were considerably smaller than their standard errors. (In fact, the largest point estimate of a correlation between an error in sons' reports and a stochastic disturbance was .09). This does not support the hypothesis that men make background reports consistent with their own status.[20]

Model II provided the best fit among Models I, II, III, and IV. In Model II, only the estimated covariance between the errors in sons' reports of mothers' and of fathers' education was greater than twice its standard error. Mare and Mason (1978) also found evidence that errors in sons' reports of mothers' and of fathers' education covary for sixth and ninth grade white boys. Estimates of the other two correlations were approximately .02, and in each case the estimate of correlated error was less than one-fourth its standard error. Next Model II was simplified by setting the insignificant error covariances to zero (Model V) and this new model was estimated.

Parameter Estimates in the Measurement Model

Young men's retrospective reports of their parents' traits were consistently less reliable than were the parents' reports of their own traits. The reliability coefficients of sons' reports ranged from .665 to .772, while those of parents ranged from .831 to .926 (Table 6.4, column 6).[21] Sons' reports always had more error variance than did parents' reports (Table 6.4, column 3). And the coefficient, (λ_{kj}) of the reported score on the true score was always lower for sons than for parents, and for two out of three parental traits

---

[20] Results are similar if we compare Models I and III. Allowing sons' reporting errors to freely covary with the stochastic disturbances of the endogenous variables does not significantly improve the "fit."

[21] Mothers' reports of their education in 1976 are seemingly less reliable than fathers' reports of their wives' education in 1968. This is not surprising. The variable of interest is mother's education while son was growing up. Any additional schooling mothers report having received between the time their sons left home and 1976 will be interpreted as error variance in these analyses.

Table 6.4

OBSERVED MOMENTS AND MEASUREMENT MODEL PARAMETER ESTIMATES

(For all employed white men aged 23-20 in 1976, who lived with both parents in 1968 and whose
parents reported their own status characteristics
and who reported their parents' characteristics.)

Variable		Mean of Observed Score (1)	Standard Deviation of Observed Scores (2)	Standard Deviation of Error (3)	Standard Deviation of True Scores (4)	Relative Slope a/ λ_{kj} (5)	Reliability Coefficient b/ (6)	Correlations Between Sons' and Parents' Reports (7)
True	Observed							
Father's Occupation (ED_{f-t})	ED_{f-f}	10.80	3.59	1.38		1.000	.855	.788
	ED_{f-s}	10.75	3.39	1.77	3.32	0.868(.051)	.726	
Father's Occupation (OCC_{f-t})	OCC_{f-f}	37.15	20.54	8.38	18.75	1.000	.831	.802
	OCC_{f-s}	34.51	19.36	9.23		0.907(.059)	.772	
Mother's Education (ED_{m-t})	ED_{m-f}	10.98	2.85	.72		1.039(.038)	.926	.768 ($r_{ED_{m-s}, ED_{m-f}}$)
	ED_{m-s}	11.24	2.81	1.66	2.64	0.868(.049)	.665	.774 ($r_{ED_{m-s}, ED_{m-m}}$)
	ED_{m-m}	10.94	2.83	1.02		1.000	.870	.903 ($r_{ED_{m-f}, ED_{m-m}}$)

---

a/ Standard errors are in parenthesis.

b/ Reliability is defined as the ratio of an indicator's true variance to the total variance in the indicator.

(father's and mother's education), this difference was significant (Table 6.4, column 5).[22]

Changes in Structural Equations

Tables 6.5 and 6.6 report structural equations of the attainment process with and without adjustments for measurement error. For the most part I compare models estimated under the assumption that sons' reports are without error (assumption 1) to models estimated under the assumption that measurement error exists and has the structure specified in Model V (assumption 3).

There are three consistent patterns in these tables:

1. Models which assumed no measurement error in sons' reports of background traits underestimated the overall effect of background in achievement. The R^2 in the equations of sons' education on background rose by 26 percent from .210 to .274; the R^2 in the reduced-form equation of occupational status on background rose by 37 percent from .094 to .132; and the R^2 in the reduced-form equation of _ln_ hourly wage on background rose by 45 percent from .038 to .055. These proportional increases would probably be even larger if we could correct for random measurement error in sons' reports of their own status (See Bielby, 1977a,b).

2. If we compare equations which use sons' uncorrected reports of parental status (assumption 1) to equations which use parents' uncorrected reports of their own status (assumption 2), results look much the same. Researchers like Borus and Nestel who assume that parental reports of their own status are without error will somewhat underestimate the extent to which failure to correct for measurement error distorts estimates of the early achievement process.

3. The effect of schooling on occupational status and _ln_ hourly wages is unchanged by corrections for measurement error. This is consistent both with Bielby's work and with results from sibling data (Olneck, 1977).

In addition, these results indicate that the size of two (nonstandardized) parameter estimates in the reduced form-equations changes dramatically when we compare parameters estimated under the assumption of no error in sons' reports to parameters estimated under Model V. The coefficient of fathers' education increased by more than two-thirds in the regression of occupation on background; the coefficient of father's occupation increased by 75 percent in the regression of _ln_ hourly wages on background.

---

[22] That is, the 95 percent confidence interval around λ_{ks} did not include 1.00.

Table 6.5

MODELS OF EARLY STATUS ATTAINMENT UNDER DIFFERENT ASSUMPTIONS OF MEASUREMENT ERROR

(For all employed white men aged 23-30 in 1976, who lived with both parents in 1968 and whose parents reported their own status characteristics and who reported their parents' characteristics in 1976.)

Assumptions About Measurement Error[a]		
1	$ED_{s-s} = \underset{(.063)}{.194}\ ED_{f-s} + \underset{(.010)}{.019}\ OCC_{f-s} + \underset{(.067)}{.124}\ ED_{m-s}$	$R^2 = .210$
2	$ED_{s-s} = \underset{(.060)}{.176}\ ED_{f-f} + \underset{(.009)}{.022}\ OCC_{f-f} + \underset{(.065)}{.145}\ ED_{m-f}$	$R^2 = .259$
3	$ED_{s-s} = \underset{(.107)}{.253}\ ED_{f-t} + \underset{(.015)}{.015}\ OCC_{f-t} + \underset{(.088)}{.123}\ ED_{m-t}$	$R^2 = .274$
1	$OCC_{s-s} = \underset{(.601)}{1.491}\ ED_{f-s} + \underset{(.093)}{.161}\ OCC_{f-s} - \underset{(.642)}{.367}\ ED_{m-s}$	$R^2 = .094$
2	$OCC_{s-s} = \underset{(.586)}{1.447}\ ED_{f-f} + \underset{(.089)}{.146}\ OCC_{f-f} - \underset{(.638)}{.054}\ ED_{m-f}$	$R^2 = .109$
3	$OCC_{s-s} = \underset{(1.043)}{2.628}\ ED_{f-t} + \underset{(.142)}{.097}\ OCC_{f-t} - \underset{(.858)}{1.021}\ ED_{m-t}$	$R^2 = .132$
1	$LNWAGE = \underset{(.014)}{.006}\ ED_{f-s} + \underset{(.002)}{.004}\ OCC_{f-s} - \underset{(.015)}{.001}\ ED_{m-s}$	$R^2 = .038$
2	$LNWAGE = \underset{(.012)}{.004}\ ED_{f-f} + \underset{(.002)}{.005}\ OCC_{f-f} - \underset{(.015)}{.010}\ ED_{m-f}$	$R^2 = .040$
3	$LNWAGE = \underset{(.023)}{.006}\ ED_{f-t} + \underset{(.003)}{.007}\ OCC_{f-t} - \underset{(.019)}{.023}\ ED_{m-t}$	$R^2 = .055$

---

[a] 1 = Sons' reports used

2 = Parents' reports used

3 = Measurement error Model V is assumed

Table 6.6

CORRECTED AND UNCORRECTED STRUCTURAL EQUATION MODELS OF THE EARLY ACHIEVEMENT PROCESS

(For all employed white men aged 23-30 in 1976, who lived with both parents in 1968 and whose parents reported their own status characteristics and who reported thier parents' characteristics.)

Assumptions About Measurement Error a/	Equation
1	$OCC_{s-s} = \underset{(.54)}{5.41}\ ED_{s-s} + \underset{(.507)}{.441}\ ED_{f-s} + \underset{(.078)}{.060}\ OCC_{f-s} - \underset{(.535)}{1.038}\ ED_{m-s}$
2	$OCC_{s-s} = \underset{(.56)}{5.37}\ ED_{s-s} + \underset{(.500)}{.501}\ ED_{f-f} + \underset{(.075)}{.026}\ OCC_{f-f} - \underset{(.539)}{.834}\ ED_{m-m}$
3	$OCC_{s-s} = \underset{(.59)}{5.39}\ ED_{s-s} + \underset{(.875)}{1.213}\ ED_{f-t} + \underset{(.112)}{.024}\ OCC_{f-t} - \underset{(.710)}{1.902}\ ED_{m-t}$
1	$LNWAGE = \underset{(.014)}{.065}\ ED_{s-s} - \underset{(.013)}{.007}\ ED_{f-s} + \underset{(.002)}{.003}\ OCC_{f-s} - \underset{(.014)}{.001}\ ED_{m-s}$
2	$LNWAGE = \underset{(.014)}{.070}\ ED_{s-s} - \underset{(.013)}{.008}\ ED_{f-f} + \underset{(.002)}{.003}\ OCC_{f-f} - \underset{(.014)}{.020}\ ED_{m-m}$
3	$LNWAGE = \underset{(.015)}{.071}\ ED_{s-s} - \underset{(.023)}{.013}\ ED_{f-t} + \underset{(.003)}{.006}\ OCC_{f-t} - \underset{(.018)}{.031}\ ED_{m-t}$

---

a/ 1 = Sons' reports assumed correct

2 = Fathers' reports assumed correct

3 = Measurement Model V assumed correct

Comparison of the Present Results with Bielby's

The present results differ from those reported by the Bielby study in three respects. First, Bielby concluded that men's reports of parental status were as reliable as were men's reports of their own status. Here we found that men's reports of their parents' status had lower reliabilities than did parents' reports of their own status. Second, the Bielby study results suggest adjustments for measurement error in background reports increase the R^2 for the reduced-form equation of occupation on background by about 22 percent from .180 to .220. In the present results, the R^2's in the reduced-form equation of occupational status on background rose by about 37 percent from .094 to .132 after adjusting for measurement error in retrospective reports for background. (Since we are dealing with reliabilities, it is appropriate to compare proportional increases.) Third, Bielby found no evidence of correlated error in sons' reports of background measures, while here we found a significant correlation of .37 between errors in sons' reports of mothers' schooling and errors in sons' reports of fathers' schooling. This difference is hardly surprising since Bielby did not include maternal education as a background measure.

There is another less striking difference between these results and those of the Bielby study. In Bielby's results, adjustments for measurement error did not substantially increase the nonstandardized coefficients of background measures in the reduced-form occupation equation. But here, in the reduced-form equations, the estimated coefficients of father's education on occupation and of father's occupation on ln hourly earnings increased by more than two-thirds with adjustments for measurement error. Note, however that adjustments for measurement error would not affect the overall conclusion from these data. Both before and after adjusting for measurement error, fathers' education was the only significant predictor of sons' schooling and occupational status while fathers' occupation was the only significant predictor of son's hourly wage.

Bielby's data are not inconsistent with the present findings. The reliabilities of parents' reports of their own status in these results are similar to those which Bielby estimated for men's reports of their own status. Neither analysis found that measurement error in background variables seriously inflated estimated economic returns to schooling.

But, according to these results measurement error in sons' retrospective reports of parental backgrounds may be considerably more serious than Bielby concluded. Bielby's assumption that between-occasion correlated error in men's retrospective reports of parental traits was of the same magnitude as between-occasion correlated errors in men's reports of their own status may be invalid. If this assumption were invalid, then Bielby may have incorrectly assigned some of this correlated error variance as true variance. That is, Bielby showed that men report parental traits consistently over time. These results indicate that some of this consistency may be due to consistent reporting errors.

Summary and Conclusion

Contrary to other research, this analysis has shown that men's retrospective reports of parental traits are considerably more prone to measurement error than are men's reports of their own current status. Failure to correct for such measurement error may lead us to underestimate the role of family background as a determinant of socioeconomic status, as was argued by Bowles and Nelson (1974). But contrary to Bowles' and Nelson's prediction, failure to correct for such measurement error does not lead us to overestimate the importance of schooling as a determinant of occupation and earnings. This finding is consistent with those of Bielby (1977a,b) and Olneck (1977). These results further indicate that studies of measurement error in retrospective reports of background which use different reports by the same observer to identify error variance may yield inflated reliability estimates since it is difficult to correctly identify consistent mistakes over time (between-occasion correlated errors).

References

Bielby, W. G.; Hauser, R. M.; and Featherman, D. L. "Response Errors of Black and Nonblack Males in Models of the Intergenerational Transmission of Socioeconomic Status." American Journal of Sociology, 1977a 82: 1242-1288.

_____. "Response Errors of Nonblack Males in Models of the Stratification Process." Journal of the American Statistical Association, 1977b 72: 723-735.

Blau, Peter M., and Duncan, Otis Dudley. The American Occupational Structure. New York: Wiley, 1967.

Borus, Michael E., and Nestel, Gilbert. "Response Bias in Reports of Father's Education and Socioeconomic Status." Journal of the American Statistical Association, December 1973, Vol. 68, #344.

Bowles, Samuel. "Schooling and Inequality from Generation to Generation," Journal of Political Economy 1972 (May/June): S219-S251.

Bowles, Samuel, and Gintis, Herbert. Schooling in Capitalist America. New York: Basic Books, 1976.

Bowles, Samuel, and Nelson, Valerie I. "The 'inheritance of IQ' and the Intergenerational Reproduction of Economic Inequality." *Review of Economics and Statistics* 56 (February): 39-51.

Chamberlain, Gary. "Identification in Variance Components Models." Working draft, Cambridge, Mass., April 1976.

Duncan, Otis Dudley; Featherman, David L.; and Duncan, Beverly. *Socioeconomic Background and Achievement*. New York: Seminar Press, 1972.

Goldberger, A. S., and Duncan, O. D. *Structural Equation Models in the Social Sciences*. New York: Seminar Press, 1973.

Griliches, Zvi; Hall, B. H. and Hausman, J. "Missing Data and Self-Selection in Large Panels," *Annles de l'Insee*, 30-31 (April-September), Special Issues-Economics of Panel Data, 1978.

Hill, Martha Scott. *The Decision by Young Adults to Split Off from Their Parents' Household*. Unpublished dissertation, The University of Michigan, Ann Arbor, 1977.

Jencks, Christopher; Smith, Marshall; Acland, Henry; Bane, Mary Jo; Cohen, David; Gintis, Herbert;Heynes, Barbara; and Michelson, Stephen. *Inequality: A Reassessment of the Effect of Family and Schooling in America*. New York: Basic Books, 1972.

Joreskog, K. G. "A General Approach to Confirmatory Maximum Likelihood Factor Analysis." *Psychometrika* 34: 183-202, 1969.

Joreskog, K. G., and Sorbom, D. *LISREL IV: Analysis of Linear Structural Relationships by the Method of Maximum Likelihood*. Chicago: National Educational Resources, 1978.

Mare, Robert D., and Mason, William M. "A Multiple Group Measurement Model of Children's Reports of Socioeconomic Status." Working paper, Center for Population Studies, The University of Michigan, Ann Arbor, 1978.

Mason, William H; Hauser, Robert M.; Kerckhoff, Alan C.; Poss, Sharon Sanomirsky; and Manton, Kenneth. "Models of Response Error in Student Reports of Parental Socioleconomic Characteristics." In *Schooling and Achievement in American Society*, edited by William H. Sewell, Robert M. Hauser, and David L. Featherman, pp. 443-494. New York: Academic Press, 1976.

Olneck, Michael R. "The Effects of Education on Occupational Status and Earnings," Institute for Research on Poverty Discussion Paper 358-76, August 1976, Madison, Wisconsin.

Chapter 7

DIMENSIONS OF OCCUPATION

Martha Hill and James N. Morgan

INTRODUCTION

In a popularity poll of variables most frequently used in empirical analyses of labor market issues, occupation would undoubtedly rank near the top--along with age, sex, race, and education. A major reason for its "popularity" is the widespread use of occupation both as a control variable and as a proxy for unmeasured qualities, including qualities a worker has and chooses to offer in the market, the qualities a worker seeks in a job, and the qualities required or offered by jobs available in the market. In many respects, occupation is really a summary index for these characteristics.

This multidimensionality of the occupation variable is an asset for some analysis purposes. Because it reflects so many elements of a worker's position in the social organization of production, occupation is an important component of indices of social status and prestige. (See, for example, Duncan, 1961; Blau and Duncan, 1967; Siegel, 1971; Duncan, Featherman, and Duncan, 1972; Sewell and Hauser, 1975; and Featherman, Sobel, and Dickens.) However, the multidimensionality is a drawback for other types of analysis: its use as a control or proxy variable may be quite treacherous because occupation is a summary measure of so many things. Occupation may embody unobserved qualities which are correlated with other predictors that are included in such analyses and, if so, it can distort the observed effects of these related predictors. Even if this problem does not arise, occupation itself may reflect the influence of such a diverse set of qualities that interpreting its effects can be difficult.

Better understanding of topics analyzed with occupation as a control or proxy variable could, of course, be gained by using specific measures for each of the qualities of interest. This might require additional questions in general purpose surveys, but methodological studies have shown that several questions are necessary to code even occupation properly.[1] Thus, when the survey purpose is well defined it may prove more useful to obtain direct measures of the characteristics for which occupation is believed to be a proxy than to press for all the information necessary to code a three-digit occupation variable.

To provide a more concrete idea of the multifaceted nature of occupation, we explore in this chapter the relationship between occupation and an extensive, but by no means exhaustive, set of related qualities. We do so by examining the Panel Study data in detail for differences in characteristics of the job, the worker, and the environment and in characteristics which reflect aspects of both the job and the worker. We then assess the value of using specific job characteristics, rather than occupation, as predictors in an analysis of wage differences.

ANALYSIS

For the analysis we used two 1976 Panel Study samples, one a subgroup of the other: the first was all husbands, wives, and unmarried household heads, and the second was white male household heads only. Both of these samples consisted of individuals who worked at least 500 hours in 1975 and for whom occupation was ascertained. The sample sizes were 5,436 and 2,201, respectively.

Although a two-digit occupation was coded for these workers, cell sizes for the two-digit occupation measure were often too small for analysis. Since a one-digit, ten-class occupation code seemed too crude for the analysis, we compromised on the following 15 category classification of occupation:

Teachers (refers to primary and secondary school teachers)

Technicians

Professionals (all professionals except primary and secondary school teachers and technicians)

Managers, Employed

---

[1] A recent evaluation of the 1970 Census Occupational Classification system illustrates the complex nature of "occupation." The evaluation, (Bureau of the Census, 1978) compared the clerically coded 1970 occupation for a subset of the population (a sample of those coded in engineering, scientific, and technical occupations) with the 1970 occupation given by the same individuals two years later. A major outcome of this evaluation was the recommendation that: "It should be stressed to the Census coders that information in all sections of the census occupational question should be considered before they assign an occupation code." They found that coders ignoring information on the respondent's most important duties or job title and relying only on responses to the question "What kind of work were you doing?" resulted in many classification errors.

Managers, Self-employed
Clericals
Sales Workers
Foremen
Craftsmen
Protective Service Workers (including the military and police)
Operatives, Transportation
Operatives, Non-Transportation
Laborers
Services Workers
Farmers.

The resulting number and weighted percentages of workers in each occupation are presented in Appendix Table A7.1.

Measures of numerous characteristics associated with the job and the worker were available from the data. These characteristics fall into four major categories. The first category is characteristics of the job, which consist of measures of work hierarchy, advancement possibilities, education requirements, training requirements, time needed for a new person to become fully trained or qualified, pay arrangements, overtime, pensions, vacation, flexibility of the work load, type of employer, industry, and union status of the job. The second category is characteristics of the worker, which consist of measures of experience, work horizon, race, sex, age, marital status, and education. The third is characteristics of the environment, which consist of measures of region, city size, and the county unemployment rate. The final category consists of characteristics which reflect aspects of both the job and the worker; these depend both on the time or skills supplied by the worker and the time or skills demanded by the job. This includes measures of wage rate, the match between skill of the worker and skill needed for the job, tenure with the present employer, work load, absence from work, and the combined union status of the job and the worker. We term these interactive qualities "combined job/worker characteristics."

All of the measures in these four categories, except the environmental ones, are based on reports of the Panel Study respondents. For analysis purposes, each was dichotomized, with a value of one if the respondent reported a specified value with respect to the characteristic and zero otherwise; e.g., if the respondent reported supervising at least three employees on his or her job, that respondent received a value of one for the characteristic "supervises three or more employees."

We examined these characteristics to see whether the proportion with that characteristic varied across the 15 occupation groups. Tables 7.1 through 7.3 give for each characteristic a summary measure of the extent to which its frequency varied over the 15 occupation categories, both for white males only and for husbands, wives, and single household heads combined. This summary measure is the eta-squared, the correlation ratio. For each characteristic the eta-squared is identical to the multiple r-squared from an ordinary regression using the occupation categories as dummy explanatory variables, or the value of a discriminant function, or the fraction of the variance accounted for in an analysis of variance components. There are, of course, some statistical problems with dichotomous dependent variables, particularly when the proportion is close to 1 or to 0 or when the sample size is small. In this analysis, however, using maximum likelihood methods such as logit to correct for these problems would have made no appreciable difference except to reduce clarity.

With this eta-squared measure we found an impressively large number of important characteristics of the job and of the worker that were distributed unevenly across the occupations. This indicates that occupation is a proxy for many other things. But further detail is required to understand the relationship between occupation and these characteristics.

This detail is provided by tabulations of the percentage within each occupation group that reported the various job and worker characteristics. These comprehensive tabulations resulted in a rather overwhelming display of numbers. (See Appendix Tables A7.2 through A7.4 for these figures.) To aid in comprehension of the important findings from these tabulations, we prepared summary tables (Tables 7.4 through 7.6) listing the occupations for which each characteristic was reported far more often or far less often than was average for the overall sample. Differences were included in these tables only if they were quantitatively important as well as statistically significant.

Tables A7.2 through A7.4 give details both for white male household heads and for all husbands, wives, and unmarried heads, but since there appear to be few differences between these two groups we restrict our summary in Tables 7.4 through 7.6 to the more inclusive group.

To construct these summary tables, we compared the percentage in each occupation subgroup reporting a particular characteristic with the percentage of the entire sample reporting that characteristic. Significance tests for differences in these percentages are based on the sampling errors of the

Table 7.1 (Page 1 of 2)

FRACTION OF VARIANCE (ETA-SQUARED) OF JOB CHARACTERISTICS EXPLAINED BY OCCUPATION CATEGORIES

Characteristics of the Job	Eta-Squared: Working White Male Household Heads	Eta-Squared: Working Household Heads and Wives
Work Hierarchy		
Supervises three or more employees	.256**	.252**
Has say over others' pay or promotion	.288**	.286**
Boss has a boss	.236**	.174**
Advancement Possibilities		
Job could lead to better job or promotion	.072**	.064**
Education Requirements		
Does not require at least high school education	.176**	.221**
Requires a college degree	.459**	.477**
Training Requirements		
Requires experience or special training	.095**	.097**
Time Needed for New Person to Become Fully Trained or Qualified		
Takes more than one year to become trained	.149**	.200**
Pay Arrangements		
Salaried	.406**	.343**
Neither Salaried nor paid by the hour	.352**	.273**
Overtime		
Gets overtime pay	.349**	.252**
Pensions		
Covered by more than one pension (including social security)	.098**	.079**
Vacation		
One week or less paid vacation	.046**	.053**
Three or more weeks paid vacation	.123**	.100**
Flexibility of Work Load		
More work available on the job	.031**	.031**
Could work less	.049**	.043**

Table 7.1 (Page 2 of 2)

Characteristics of the Job	Eta-Squared	
	Working White Male Household Heads	Working Household Heads and Wives
Type of Employer		
Employer is a government	.312**	.239**
Self-employed	.417**	.382**
Industry		
Service industry	.233**	.314**
Manufacturing industry	.209**	.323**
Union Status		
Job with union contract	.221**	.145**
Number of Observations	2201	5436

**Significant at .01 level.
*Significant at .05 level.

Table 7.2

FRACTION OF VARIANCE (ETA-SQUARED) OF WORKER OR ENVIRONMENTAL CHARACTERISTICS EXPLAINED BY OCCUPATION CATEGORIES

Characteristics of the Worker or the Environment	Eta-Squared	
	Working White Male Household Heads	Working Household Heads and Wives
Characteristics of the Worker:		
Experience		
Worked more than 10 years since age 18	.054**	.054**
Worked less than three-quarters of the years since age 18	.033**	.067**
Work Horizon		
Plans to quit working in next few years	.012*	.011**
Race/Sex		
Black male	--	.041**
White female	--	.252**
Black female	--	.068**
Age		
Under age 30	.060**	.041**
Aged 60 or older	.034**	.023**
Education		
Less than high school degree	.147**	.185**
College degree	.402**	.432**
Marital Status		
Single	.027**	.022**
Widowed, divorced, or separated	.011*	.031**
Characteristics of the Environment:		
Region		
Northeast	.030**	.013**
South	.017**	.010**
West	.011*	.012**
City Size		
City of 500,000 or more	.057**	.036**
City of less than 10,000	.075**	.054**
Local Unemployment Rate		
County unemployment rate under 4%	.072**	.042**
County unemployment rate 9% or higher	.016**	.013**
Number of Observations	2201	5436

**Significant at .01 level.

*Significant at .05 level.

Table 7.3

FRACTION OF VARIANCE (ETA-SQUARED) OF COMBINED JOB/WORKER CHARACTERISTICS EXPLAINED BY OCCUPATION CATEGORIES

Combined Job/Worker Characteristics	Eta-Squared	
	Working White Male Household Heads	Working Household Heads and Wives
Wage Rate		
Earned more than $10 per hour	.121**	.112**
Earned less than $5 per hour	.165**	.221**
Match between Skill of Worker and Skill Needed for Job		
Has skills not used in present job	.028**	.011**
Tenure with Present Employer		
Worked for present employer 1 year or less	.042**	.028**
Worked for present employer 5 years or more	.101**	.059**
Work Load		
Worked more than 40 weeks on main job in 1975	.104**	.136**
Worked less than 35 hours/week on main job	.031**	.057**
Worked more than 40 hours/week on main job	.088**	.138**
Worked more than 40 hours/week on all jobs	.016**	.071**
Had second job	.028**	.023**
Wanted more work	.076**	.055**
Wanted less work	.007	.007**
Absence from Work		
Missed 3 or more weeks due to illness of self or others	.033**	.023**
Took 1 week or less vacation	.020**	.018**
Took 3 weeks or more vacation	.090**	.101**
Unemployed 3 or more weeks	.085**	.064**
Union Status		
Union member or union job	.229**	.156**
Number of observations	2201	5436

**Significant at .01 level.
*Significant at .05 level.

percentages. To assure the reader that the differences included in Tables 7.4 through 7.6 are significant differences, we include the nomogram in Figure 7.1.[2] This nomogram allows the reader to find the sampling error for any comparison given the overall percentage and the number of cases in the subgroup on which the comparison is based.[3] But while we have checked to be sure the deviant occupations we mention for each characteristic are significantly deviant, we have added a criterion that they should also differ by a substantial number of percentage points from the average--around 20 for overall percentages near 50 percent, ranging down to 10 for overall percentages near 10 percent or 90 percent.

As the summary tables show, the job and worker characteristics distinguish the various occupations in an irregular manner. Occupations which are similar with respect to one distinguishing characteristic are quite dissimilar with respect to other distinguishing characteristics. Looking first at the summary table for job characteristics (Table 7.4), we find, for example, that influence over employees ("supervises 3 or more employees" and "has say over others' pay or

---

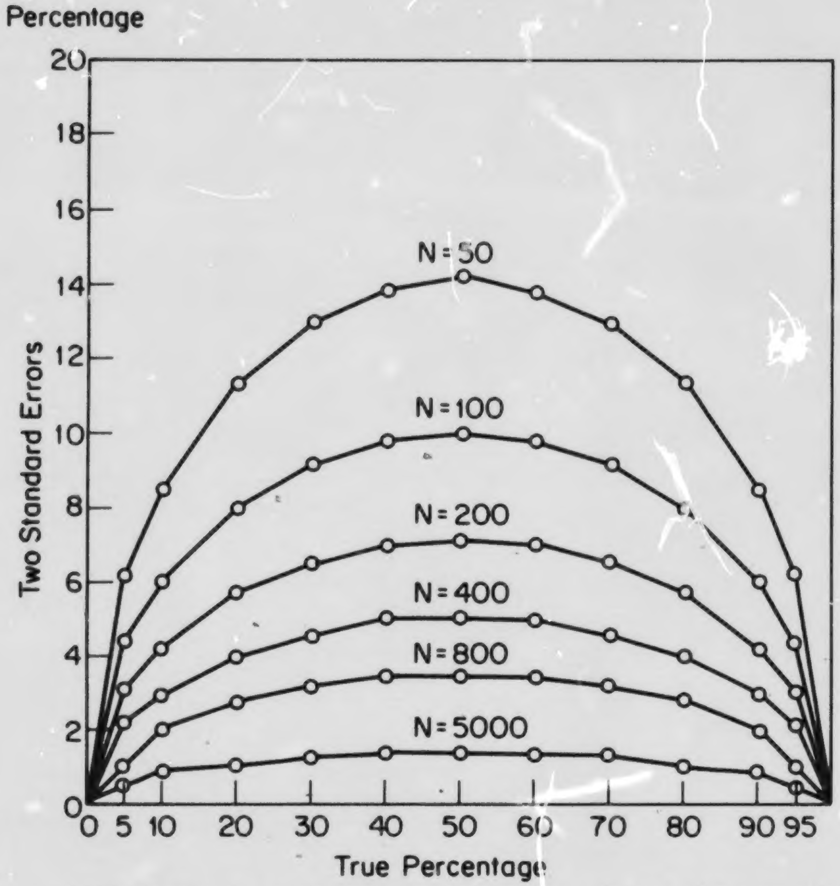
[2] Approximate tests for significance can be made using only the size of the occupation group (from Table A7.1) and the overall proportion with that characteristic (from Tables A7.2 through A7.4). For example, these tables indicate that 20 percent of the sample of 5,436 workers worked for a government, whereas 77 percent of the 202 teachers were government employees. To test whether teachers differed significantly from average employees with respect to their likelihood of working for a government, we computed the sampling errors for these two proportions. The sampling error for the first proportion is the square root of [(.20 x .80)/5436)], or 0.54 percent, and for the latter proportion it is the square root of [(.77 x .23)/202], or 2.96 percent. But if we take the overall proportion as "true" and ignore its small sampling error, it is easier to test the various subgroup differences from the overall.

Significance tests based on these sampling errors do not allow for design effects (the Panel Study uses clustered sampling, which is less efficient per case than simple random sampling) or for the fact that the subgroup is part of the whole sample (the contribution of the subgroup mean to the overall mean should be removed for these computations). To allow for these factors (although the design effect is small because clustering has less effect as the size of the subgroup decreases) in the summary tables we list differences that are large enough to substantially exceed the minimum level required for significance at the .01 level with this type of test. As noted in the text, occupations are listed in the summary tables only if they differ by a substantial number of percentage points from the average--around 20 for overall percentages near 50, ranging down to 10 for overall percentages near 10 or 90 percent.

[3] Since the estimated sampling variance depends on the true percentage, and we seek to reject the hypothesis that the occupation subgroup has that percentage with the characteristic in question, we use the overall percentage as the approximate "truth" (read along the horizontal axis) and the subgroup number of cases (N) in the graph to estimate the sampling error of the subgroup deviation.

FIGURE 7.1

LEVELS OF TWO STANDARD ERRORS FOR VARIOUS TRUE PERCENTAGES AND SAMPLE SIZES*



*See footnote 3 for an explanation of how this graph was used in the context of this chapter.

Table 7.4 (Page 1 of 5)

OCCUPATIONS WITH LARGE DEVIATIONS FROM THE OVERALL MEAN FREQUENCY OF JOB CHARACTERISTICS

(For working household heads and wives)

Job Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Work Hierarchy					
Supervises three or more employees	28%	Foremen	93%	Teachers	9%
		Managers, employed	77%	Operatives, transportation	9%
				Laborers	11%
				Operatives, non-transportation	11%
Has say over others' Pay or promotion	24%	Managers, employed	74%	Operatives, transportation	3%
		Managers, self-employed	59%	Operatives, non-transportation	4%
		Foremen	54%	Laborers	6%
		Farmers	53%	Teachers	6%
				Service workers	7%
Boss has a boss	69%	Protective Service	99%	Managers, self-employed	3%
		Teachers	92%	Farmers	4%
		Operatives, non-transportation	86%		
		Foremen	86%		

Table 7.4 (Page 2 of 5)

Job Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Advancement Possibilities					
Job could lead to better job or promotion	67%	Protective service	87%	Farmers	37%
				Managers, self-employed	41%
				Operatives, transportation	46%
				Service workers	53%
				Operatives, non-transportation	55%
				Laborers	56%
Education Requirements					
Does not require at least high school education	26%	Laborers	68%	Teachers	1%
		Farmers	52%	Professionals	3%
		Service workers	51%	Technicians	3%
		Operatives, non-transportation	49%	Protective service	4%
		Operatives, transportation	49%	Clerical	8%
				Managers, employed	9%
Requires a college degree	19%	Teachers	89%	Laborers	0%
		Professionals	71%	Operatives, transportation	0%
				Operatives, non-transportation	1%
				Service workers	1%
				Craftsmen	1%
				Foremen	4%
				Clerical	4%
				Farmers	5%

Table 7.4 (Page 3 of 5)

Job Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Training Requirements					
Requires experience or special training	63%	Managers, employed	82%	Laborers	29%
		Craftsmen	82%	Teachers	37%
				Operatives, nontransportation	43%
Time Needed for New Person to Become Fully Trained/Qualified					
takes more than 1 year to become trained	36%	Foremen	62%	Operatives, transportation	8%
		Craftsmen	60%	Service workers	10%
		Teachers	60%	Laborers	12%
		Managers, employed	59%	Operatives, nontransportation	14%
		Farmers	57%		
		Professionals	55%		
Pay Arrangements					
Salaries	45%	Teachers	94%	Operatives, nontransportation	7%
		Protective service	90%	Farmers	9%
		Managers, employed	83%	Operatives, transportation	15%
		Professionals	73%	Craftsmen	16%
		Foremen	69%	Laborers	18%
				Managers, self-employed	21%
				Service workers	24%
Neither salaried nor paid by the hour	14%	Farmers	89%	Protective service	0%
		Managers, self-employed	76%	Teachers	1%
		Sales	40%	Foremen	3%
		Operatives, transportation	25%	Clerical	3%

Table 7.4 (Page 4 of 5)

Job Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Overtime					
Gets overtime pay	44%	Operatives, non-transportation	80%	Farmers	2%
		Craftsmen	59%	Managers, self-employed	4%
				Teachers	5%
				Managers, employed	16%
				Sales	18%
				Professional	24%
Pensions					
Covered by more than 1 pension (including Social Security)	60%	Foremen	82%	Farmers	13%
				Managers, self-employed	16%
				Service workers	29%
Vacation					
1 week or less paid vacation	11%	Operatives, non-transportation	24%	Protective Service	1%
3 or more weeks paid vacation	33%	Protective service	78%	Farmers	0%
		Foremen	59%	Managers, self-employed	9%
		Technicians	51%	Sales	16%
Flexibility of Work Load					
More work available on the job	37%	Farmers	57%	None	
		Manager, self-employed	56%		
Could work less	27%	Farmers	62%	None	
Type of Employer					
Employer is a government	20%	Protective service	99%	Sales	0%
		Teachers	77%	Farmers	1%
				Managers, self-employed	2%
				Operatives, non-transportation	4%
				Foremen	8%

Table 7.4 (Page 5 of 5)

Job Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Self-employed*	11%	Managers, self-employed	95%	Foremen	0%
		Farmers	76%	Protective service	0%
				Operatives, nontransportation	1%
				Teachers	1%
Industry					
Service industry	31%	Teachers	98%	Farmers	0%
		Service workers	68%	Protective service	1%
		Professionals	59%	Operatives, nontransportation	4%
				Sales	7%
				Laborers	8%
				Foremen	10%
				Operatives, transportation	10%
Manufacturing industry	24%	Operatives, non-transportation	83%	Protective service	0%
		Foremen	56%	Teachers	0%
				Farmers	0%
				Service workers	3%
				Managers, self-employed	6%
				Sales	7%
Union Status					
Job with union contract	24%	Operatives, non-transportation	52%	Farmers	0%
		Operatives, transportation	47%	Managers, self-employed	1%
		Craftsmen	45%	Managers, employed	8%
		Teachers	40%		

*Respondents received a value of 1 on the characteristic "self-employed" if they reported working for themselves only. If they reported working for someone else, even if they also worked for themselves, they received a value of 0 on this characteristic.

Table 7.5 (Page 1 of 3)

OCCUPATIONS WITH LARGE DEVIATIONS FROM THE OVERALL MEAN FREQUENCY of WORKER OR ENVIRONMENTAL CHARACTERISTICS

(For working household heads and wives)

Worker or Environmental Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average: Occupation	Much Higher than Average: Frequency within the Occupation	Much Lower than Average: Occupation	Much Lower than Average: Frequency within the Occupation
Experience					
Worked more than 10 years since age 18	64%	Farmers	88%	Protective service	43%
		Foremen	87%		
		Managers, self-employed	84%		
Worked less than 3/4 of years since 18	22%	Teachers	34%	Craftsmen	5%
		Clerical	34%	Foremen	5%
		Service workers	34%	Protective service	6%
				Farmers	8%
Work Horizon					
Plans to quit working in next few years	6%	None		None	
Race/Sex					
Black male	7%	Laborers	30%	Farmers	1%
		Operatives, transportation	17%	Teachers	1%
White female	33%	Clerical	70%	Protective service	1%
		Teachers	63%	Farmers	1%
		Service workers	53%	Craftsmen	2%
				Laborers	6%
				Operatives, transportation	6%
				Foremen	9%
				Managers, self-employed	14%

Table 7.5 (Page 2 of 3)

Worker or Environmental Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average: Occupation	Much Higher than Average: Frequency within the Occupation	Much Lower than Average: Occupation	Much Lower than Average: Frequency within the Occupation
Black female	6%	Service workers	20%	Farmers	0%
				Foremen	0%
				Operatives, transportation	1%
				Sales	1%
				Craftsmen	1%
				Protective service	1%
Age					
Under Age 30	31%	Protective service	61%	Foremen	12%
				Farmers	14%
				Managers, self-employed	14%
Aged 60 or over	9%	Farmers	22%	Protective service	0%
		Managers, self-employed	22%		
Education					
Less than high school degree	24%	Laborers	56%	Teachers	1%
		Operatives, nontransportation	49%	Professionals	3%
		Operatives, transportation	48%	Technicians	3%
		Farmers	44%	Managers, employed	7%
		Service workers	40%		
College degree	20%	Teachers	93%	Laborers	0%
		Professionals	71%	Operatives, transportation	1%
				Foremen	1%
				Service workers	1%
				Operatives, nontransportation	2%
				Craftsmen	3%
Martial Status					
Single	9%	Teachers	20%	None	
Widowed, divorced, or separated	13%	Service workers	25%	Farmers	3%
				Foremen	3%

Table 7.5 (Page 3 of 3)

Worker or Enviromental Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Region					
Northeast	22%	None		Farmers	2%
South	30%	Laborers	48%	None	
West	19%	None		None	
City Size					
City of 500,000 or more	33%	None		Farmers Laborers	[illegible] 12%
City of less than 10,000	13%	Farmers Operatives, transportation	54% 24%	None	
Local Unemployment Rate					
County unemployment rate under 4%	12%	Farmers	53%	None	
County unemployment rate 9% or higher	30%	None		Farmers	10%

Table 7.6 (Page 1 of 2)

OCCUPATIONS WITH LARGE DEVIATIONS FROM THE OVERALL MEAN FREQUENCY OF JOB/WORKER CHARACTERISTICS
(For working household heads and wives)

Job/Worker Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average		Much Lower than Average	
		Occupation	Frequency within the Occupation	Occupation	Frequency within the Occupation
Wage Rate					
Earned more than $10/hour	11%	Managers, employed	26%	Service workers	0%
		Professionals	26%	Laborers	0%
				Operatives, transportation	0%
				Operatives, non-transportation	1%
Earned less than $5/Hour	52%	Service workers	90%	Professionals	20%
		Farmers	79%	Foremen	21%
		Laborers	74%	Managers, employed	25%
Match Between Skill of Worker and Skill Needed for Job					
Has skills not used in present Job	53%	None		Farmers	27%
Tenure with Present Employer					
Worked for present employer 1 year or Less	16%	None		Manager, self-employed	1%
				Farmers	2%
				Foremen	4%
Worked for Present employer 5 years or more	46%	Foremen	82%	Managers, self-employed	2%
				Farmers	16%
Work Load					
Worked more than 40 weeks on main job in 1975	80%	Foremen	98%	Teachers	21%
		Protective service	98%		
		Managers, employed	95%		
		Farmers	94%		

Table 7.6 (Page 2 of 2)

Job/Worker Characteristic	Mean Frequency of Characteristic Over All Occupations	Much Higher than Average: Occupation	Much Higher than Average: Frequency within that Occupation	Much Lower than Average: Occupation	Much Lower than Average: Frequency within that Occupation
Worked less than 35 hrs/week on main Job	12%	Teachers	24%	Foremen	0%
Worked more than 40 hrs/week on main Job	36%	Farmers	74%	Clerical	12%
		Managers, self-employed	69%		
		Managers, employed	62%		
		Foremen	58%		
Worked more than 40 hrs/week on all jobs	61%	Farmers	84%	Service workers	39%
Had second job	17%	Teachers	33%		
		Farmers	31%	None	
Wanted more work	20%	Laborers	38%	Farmers	3%
Wanted less work	5%	None		None	
Absence From Work					
Missed 3 or more weeks due to illness self or others	12%	None		None	
Took 1 week or less vacation	15%	None		None	
Took 3 weeks or more vacation	36%	Teachers	87%	Farmers	12%
		Protective service	57%		
		Foremen	54%		
Unemployed 3 or more weeks	13%	Laborers	35%	Farmers	2%
		Craftsmen	25%		
		Operatives non-transportation	24%		
Union Status					
union member of Union Job	21%	Operatives non-transportation	48%	Farmers	0%
		Operatives transportation	43%	Managers, self-employed	1%
		Craftsmen	42%	Managers, employed	4%

promotion") is particularly common among foremen and employed managers, but rare among operatives, laborers, and teachers. However, operatives and laborers are quite different from teachers when it comes to the educational requirements of their jobs. On the other hand, foremen and employed managers are similar to teachers when it comes to the length of time required for the average new person to become fully trained or qualified for the job (all three occupations are more likely than most to require at least one year for a new person to become trained).

We find similar irregular patterns with respect to worker or environmental characteristics (Table 7.5) and combined job/worker characteristics (Table 7.6). For example, protective service workers are similar to farmers and foremen in that all are less likely than workers in most other occupations to have worked less than three-quarters of the years since they were 18. However, protective service workers are likely to be young, whereas farmers and foremen are rarely under age 30. And both foremen and protective service workers are particularly likely to have taken three or more weeks of vacation in 1975, whereas farmers--probably due to the demands of their work--are particularly unlikely to have done so. We also find that foremen and laborers, who differed substantially with respect to their influence over other employees, are both considerably less likely to have a college degree than are workers in most other occupations.

We could point out many other instances of the irregular pattern in which occupations differ, but this would have little meaning unless the distinguishing characteristics show important effects on a dependent variable of interest. One such dependent variable is the wage rate, for which occupation is often used as a predictor. To test the effects of these characteristics on the wage rate, we regressed the natural logarithm of the hourly wage rate[4] on the worker and environmental characteristics ordinarily included in wage regressions--first alone (Regression #1), then adding in occupation variables (Regression #2), then substituting job characteristics for the occupation variables (Regression #3), and lastly adding occupation back in (Regression #4). The results of these analyses (Table 7.7) show that the job characteristics account for much more of the variance in ln wages than does occupation[5] (here, occupation is specified as

---

[4] The wage rate is the hourly wage for those reporting an hourly wage less than $9.98, otherwise it is average hourly earnings, calculated by dividing total labor income by annual hours worked.

[5] Of course, using a more detailed code for occupation will raise its total "explanatory power" but also its measurement error and probably the heterogeneity of its component characteristics.

Table 7.7 (Page 1 of 4)

REGRESSIONS WITH ln WAGE AS THE DEPENDENT VARIABLE
(For working household heads and wives.)

Independent Variables[a]	Regression #1[b]	Regression #2[c]	Regression #3[d]	Regression #4[e]
Characteristics of the Worker:				
Experience				
Worked more than 10 years since age 18	.206**	.188**	.124**	.115**
	(.014)	(.013)	(.013)	(.013)
Worked less than 3/4 of years since age 18	-.087**	-.074**	-.035*	-.040**
	(.018)	(.017)	(.015)	(.015)
Work Horizon				
Plans to quit working in next few years	-.030	-.029	-.027	-.027
	(.027)	(.025)	(.023)	(.023)
Race/Sex				
Black male	-.158**	-.123**	-.114**	-.092**
	(.027)	(.025)	(.023)	(.023)
White female	-.389**	-.382**	-.296**	.288**
	(.016)	(.017)	(.015)	(.016)
Black female	-.460**	-.381**	-.351**	-.300**
	(.030)	(.030)	(.027)	(.027)
[White male]				
Education				
Less than high school degree	-.198**	-.114**	-.085**	-.065**
	(.017)	(.016)	(.016)	(.015)
College degree	.351**	.209**	.196**	.151**
	(.017)	(.020)	(.020)	(.021)
[High school degree]				
Characteristics of the Environment:				
Region				
Northeast	-.024	-.028	-.048**	-.048**
	(.019)	(.018)	(.017)	(.017)
South	-.040*	-.055**	-.019	-.028
	(.018)	(.016)	(.015)	(.015)
West	-.025	-.011	.012	.013
	(.021)	(.020)	(.019)	(.018)
[North central]				

Table 7.7 (Page 2 of 4)

Independent Variables^a	Regression #1^b	Regression #2^c	Regression #3^d	Regression #4^e
City Size				
City of 500,000 or more	.147** (.015)	.125** (.014)	.131** (.013)	.118** (.013)
City of less than 10,000	-.157** (.021)	-.098** (.020)	-.062** (.018)	-.047** (.018)
[City of 10,000-499,000]				
Local Unemployment Rate				
County unemployment rate under 4%	-.090** (.022)	-.057** (.020)	-.063** (.019)	-.054** (.018)
County unemployment rate 9% of higher	.020 (.017)	.023 (.015)	.015 (.014)	.016 (.014)
[County unemployment rate 4%-8.9%]				
Occupation:				
Teachers	-	.182** (.039)	-	.053 (.042)
Technicians	-	.218** (.042)	-	.159** (.041)
Professionals	-	.241** (.030)	-	.151** (.032)
Managers, employed	-	.245** (.027)	-	.096** (.031)
Managers, self-employed	-	-.436** (.038)	-	-.201** (.043)
Clerical	-	.050* (.025)	-	.007 (.026)
Sales Workers	-	-.047 (.032)	-	.049 (.033)
Foremen	-	.261** (.043)	-	.077 (.043)
Craftsmen	-	.080** (.026)	-	.066* (.026)
Protective service	-	-.007 (.044)	-	-.103* (.047)
Operatives, transportation	-	-.070 (.038)	-	.008 (.037)
[Operatives, non-transportation]				
Laborers	-	-.266** (.041)	-	-.179** (.039)
Service workers	-	-.292** (.026)	-	-.182** (.028)
Farmers	-	-.609** (.048)	-	.331** (.050)

Table 7.7 (Page 3 of 4)

Independent Variables[a]	Regression #1[b]	Regression #2[c]	Regression #3[d]	Regression #4[e]
Characteristics of the Job:				
Work Hierarchy				
Supervises 3 or more employees	-	-	.082** (.016)	.070** (.016)
Has say in others' pay or promotion	-	-	.128** (.018)	.124** (.018)
Boss has a boss	-	-	.055** (.016)	.050** (.015)
Advancement Possibilities				
Job could lead to better job or promotion	-	-	-.013 (.013)	-.030* (.013)
Education Requirements				
Does not require at least high school education	-	-	-.094** (.015)	-.065** (.015)
Requires a college degree	-	-	.174** (.021)	.126** (.022)
[Requires a high school education]				
Training Requirements				
Requires experience or special training	-	-	.076** (.013)	.059** (.012)
Time Needed for New Person to become Fully Trained or Qualified				
Takes more than 1 year to become trained	-	-	.111** (.014)	.091** (.014)
Pay Arrangements				
Salaried	-	-	.077** (.015)	.064** (.016)
Neither salaried nor paid by the hour	-	-	-.188** (.023)	-.176** (.023)
[Paid by the hour]				
Overtime				
Gets overtime pay	-	-	.019 (.015)	.010 (.015)
Pensions				
Covered by more than 1 pension, including Social Security	-	-	.144** (.013)	.133** (.013)
Vacation				
1 week or less paid vacation	-	-	-.015 (.019)	-.010 (.019)
3 or more weeks paid vacation	-	-	.090** (.014)	.091** (.014)
[More than 1 but less 3 weeks paid vacation]				

Table 7.7 (Page 4 of 4)

Independent Variables[a]	Regression #1[b]	Regression #2[c]	Regression #3[d]	Regression #4[e]
Flexibility of Work Load				
More work available on the job	-	-	-.003	.002
			(.012)	(.012)
Could work less	-	-	.010	.013
			(.013)	(.013)
Type of Employer				
Employer is a government	-	-	-.081**	-.057**
			(.016)	(.017)
Self-employed	-	-	-.098**	-.022
			(.025)	(.027)
Industry				
Service industry	-	-	-.046**	-.045**
			(.014)	(.015)
Manufacturing industry	-	-	-.005	-.023
			(.016)	(.017)
[Industry other than service or manufacturing]				
Union Status				
Job with union contract	-	-	.180**	.173**
			(.016)	(.016)
Constant	1.555	1.543	1.241	1.286
$\bar{R}^2$	.336	.436	.510	.533

Overall Mean = 1.526
Standard Deviation = .587
Sample Size = 5436

[a] Variables in brackets represent the excluded category when more than one measure of a given characteristic is included in the analysis.

[b] Independent variables consist of characteristics of the worker.

[c] Independent variables consist of characteristics of the worker and occupation.

[d] Independent variables consist of characteristics of the worker and characteristics of the job.

[e] Independent variables consist of characteristics of the worker, characteristics of the job, and occupation.

**Significant at .01 level.

*Significant at .05 level.

a set of 14 dummy variables with non-transportation operatives as the excluded category). The adjusted R2 rises from .336 to .436 when occupation is added, then jumps up to .510 when the job characteristics are substituted for occupation.

The job characteristics also reveal things that the summary measure of occupation alone would not. For example, from Regression #3 we find that jobs which are high-paying are also better in other ways. People in jobs covered by more than one pension plan, including Social Security, and people in jobs that offer three or more weeks of paid vacation earn more than other workers. Offering some confirmation of the compensating wage theory, on the other hand, is evidence that earnings tend to increase with city size (the cost of living is also supposed to increase with city size) and that earnings are lower in counties with low unemployment rates. We also find interesting effects of position in the job hierarchy. An intermediate position in the supervisory chain appears to result in higher wages. Workers who supervise at least three employees and those who have a say over others' pay or promotion receive higher wages than other workers, and those whose boss has a boss earn more than those who have no boss or who are under their ultimate boss. Such effects could not be clearly isolated using occupation as the only indicator of job characteristics.

Adding occupation as a wage predictor along with the job characteristics (Regression #4) increases overall explanatory power by only a small, albeit significant, amount[6]; it does not alter the estimates of the effects of the job characteristics just reported. In fact, with the exception of the effect of being self-employed, the wage effects of other predictors remain quite similar when occupation is added. The addition of occupation does tell us that a substantial proportion, but not all, of the effects of occupation are accounted for by the included job characteristics.

A technique, not uncommon in the literature, for circumventing the limitations of available data is to match data from one source with that from a different sample, sorting according to a variable common to both data sets. Lucas (1977) and Hartog (1978), for example, did this in wage analyses. Lucas combined data on job characteristics from the Dictionary of Occupational Titles with data on personal characteristics and wages from the Survey of Economic Opportunity to estimate hedonic wage equations. Hartog matched Census data on income with information on types and levels of capabilities required for jobs from the Dictionary of Occupational Titles to estimate the prices paid for skills used in the market. In view of such potential uses of the information just presented in this chapter, we have investigated the effects of using "expected values" for the separate characteristics (based on mean values for the individual's occupation group) instead of the individual's actual values. Since all of the predictor variables are dummied, this means substituting the expected frequency value for the individual's occupation group (a value ranging from 0 percent to 100 percent) for the individual's own value of either 0 or 1; for example, if the individual were a teacher he would receive a value of .086 on "supervises 3 or more employees" rather than 0 or 1 since 8.6 percent of the teachers supervised three or more employees.

---

[6] With our large sample size (5,436 cases), however, even the small partial R2 = (.533-.510)/(1-.510) = .05 for occupation in Regression #4 is significant at the .01 level.

For this analysis, we included the individual's own values on the worker and environmental characteristics (generally available in data sets) as predictors of wage level, then added each job characteristic (less likely to be available in most data sets) separately as the only additional predictors. The job characteristics were first measured in terms of the individual's own value on the characteristic and then in terms of the mean frequency for the individual's occupation group. The results of this analysis (Table 7.8) indicate a fairly close match between the direct and the indirect measures in terms of both the direction and magnitude of effect for most of these characteristics. However, some effects differed substantially in magnitude. The effect of "job could lead to a better job" was much stronger when the mean value for the individual's occupation group was used instead of the individual's own response; and the significance levels of the effects of "more work available on the job," "could work less," and "service industry" were substantially altered. These results suggest the need for some caution in creating values for other variables based on occupation.

Caution is particularly advised if several variables with values based on the individual's occupation are included in the analysis. Table 7.9 presents the results of step-wise regressions, starting with the variables measuring worker and environmental characteristics listed in Table 7.7 as predictors and adding a job characteristic at each step. For comparison purposes, results of regressions using values for the job characteristics based on occupation (columns 1-3) and of regressions using values for the job characteristics based on the individual's own report (columns 4-6) are both presented. Note what happens to the coefficient on "supervises 3 or more employees" as additional job characteristics

Table 7.8 (Page 1 of 2)

REGRESSIONS WITH ln WAGE AS THE DEPENDENT VARIABLE
(For working household heads and wives)

Independent Variables[a]	Value of Independent Variable Based on Individual's Occupation		Value of Independent Variable Based on Individual's Own Report	
	Beta Coefficient	$\bar{R}2$	Beta Coefficient	$\bar{R}2$
Characteristics of the Job:				
Work Hierarchy				
Supervises 3 or more employees	.155**	.356	.159**	.359
Has say over others' pay or promotion	.068**	.340	.103**	.345
Boss has a boss	.218**	.381	.190**	.371
Advancement Possibilities				
Job could lead to better job or promotion	.295**	.407	.075**	.341
Education Requirements				
Does not require at least high school education	-.245**	.376	-.167**	.359
Requires a college degree	.200**	.358	.210**	.358
Training Requirements				
Requires experience or special training	.148**	.355	.087**	.343
Time Needed for New Person to Become Fully Trained or Qualified				
Takes more than 1 year to become trained	.171**	.356	.147**	.353
Pay Arrangements				
Salaried	.225**	.370	.196**	.368
Neither salaried nor paid by the hour	-.224**	.382	-.249**	.396
Overtime				
Gets overtime pay	.086**	.342	.115**	.348
Pensions				
Covered by more than 1 pension (including Social Security)	.327**	.431	.263**	.400

Table 7.8 (Page 2 of 2)

Independent Variable[a]	Value of Independent Variable Based on Individual's Occupation		Value of Independent Variable Based on Individual's Own Report	
	Beta Coefficient	$\bar{R}^2$	Beta Coefficient	$\bar{R}^2$
Vacation				
1 week or less paid vacation	-.065**	.339	-.055**	.339
3 or more weeks paid vacation	.272**	.398	.222**	.380
Flexibility of Work Load				
More work available on the job	-.039**	.337	-.010	.336
Could work less	-.065**	.339	-.017	.336
Type of Employer				
Employer is a government	.055**	.338	.047**	.338
Self-employed	-.193**	.371	-.198**	.373
Industry				
Service industry	-.013	.336	-.063**	.339
Manufacturing industry	.116**	.348	.101**	.346
Union Status				
Job with union contract	.076**	.341	.167**	.362

[a] Each of the independent variables listed in the table was the only independent variable in the regression other than the worker and environmental characteristic variables listed in Table 7.7. These worker and environmental characteristic variables all had values based on the individual's own report.

**Significant at .01 level.

*Significant at .05 level.

Table 7.9

REGRESSIONS WITH ln WAGE AS THE DEPENDENT VARIABLE
(For working household heads and wives.)

Independent Variables[a]	Value of Independent Variable Based on Individual's Occupation			Value of Independent Variable Based on Individual's Own Report		
	Beta Coefficient	Standard Error	Covariance Ratio	Beta Coefficient	Standard Error	Covariance Ratio
Regression #5:						
Supervises 3 or more employees	.155**	.012	.145	.159**	.011	.088
		$\bar{R}2$=.356			$\bar{R}2$=.359	
Regression #6:						
Supervises 3 or more employees	.037**	.012	.259	.145**	.011	.090
Covered by more than 1 pension plan (including Social Security)	.313**	.012	.226	.255**	.011	.075
		$\bar{R}2$=.432			$\bar{R}2$=.419	
Regression #7:						
Supervises 3 or more employees	-.014	.014	.497	.137**	.011	.102
Covered by more than 1 pension plan (including Social Security)	.313**	.012	.226	.255**	.011	.075
Requires experience or special training	.085**	.014	.437	.067**	.011	.075
		$\bar{R}2$=.436			$\bar{R}2$=.423	
Regression #8:						
Supervises 3 or more employees	-.006	.017	.642	.143**	.011	.104
Covered by more than 1 pension plan (including Social Security)	.293**	.027	.857	.209**	.011	.183
Requires experience or special training	.090**	.015	.536	.076**	.011	.080
Boss has a boss	.020	.025	.835	.130**	.011	.141
		$\bar{R}2$=.436			$\bar{R}2$=.438	

[a] Other independent variables included in the analysis are the variables listed as worker or environmental variables in Table 7.7, with values based on the individual's own report.
**Significant at .01 level.
*Significant at .05 level.

are added as wage predictors. When the "expected values" based on occupation are used, the coefficient changes dramatically from a large and significant positive value to an insignificant negative one; yet when the values based on the individual's own report are used the coefficient remains a large and significant positive value. The key to this discrepancy is the high degree of intercorrelation between measures with values based on occupation. Values for these variables are, after all, derived from the same 15 bits of information--the 15 occupation categories. And as more such variables are added to the analysis the variables will increasingly have higher correlations with combinations of the other "expected values" since they specify occupation groups. An indicator of this problem is the change in the covariance ratio--the R2 which would be obtained if the given predictor were regressed on all other predictors included in the analysis. The covariance ratio on the "expected value" variable "supervises 3 or more employees" rises dramatically as other "expected value" variables are added, but the covariance ratio on "supervises 3 or more employees" in the "reported value" regressions remains fairly stable. The common belief that intercorrelation of predictors blows up the sampling errors to warn us turns out to be untrue.

Using occupation as a proxy for any one of these job characteristics produces reasonable results, but trying to use it simultaneously as an indicator of more than one results in intractable statistical difficulties. We are left then, if we have only occupational information, with the treacherous judgment of which dimension we think it represents.

SUMMARY AND IMPLICATIONS

There are many explicit, meaningful, and easily interpretable dimensions which distinguish various occupations. They do so, however, in a very irregular manner. Some factors are very common in one or two occupations and evenly spread elsewhere. Some are very rare in a few occupations and evenly spread elsewhere. Others are frequent in some occupations, rare in some, and average in many others. The picture that appears is that occupation can mean a great many different things, about both the job (and the demand for that labor) and the worker (and his human capital and supply of work) and also about interactions between the two.

Since many of these elements are far more easily asked about and interpreted than occupational titles and descriptions, these findings suggest that we should systematically ask a sequence of explicit questions about the job rather than attempt to determine three-digit occupation codes and three-digit industry codes on the basis of answers to two or three questions plus many probes. Rather than standardizing the occupation questions and codes (the 1980 Census moves to new occupation codes), we might standardize the package of questions and codes that describe the component characteristics of jobs. For analysis using occupation as a predictor, this information would help to isolate more clearly those factors associated with occupation which underly its observed effects.

References

Blau, P. M., and Duncan, O. D. The American Occupational Structure. New York: John Wiley and Sons, 1967.

Duncan, O. D., "A Socioeconomic Index for All Occupations." In Occupation and Social Status, by Albert J. Reiss, Jr., et al. New York: Free Press of Glencoe, 1961.

Duncan, O. D.; Featherman, D. L.; and Duncan, B. Socioeconomic Background and Achievements. New York: Seminar Press, 1972.

Featherman, D. L.; Sobel, Michael; and Dickens, David. "A Manual for Coding Occupations and Industries into Detailed 1970 Categories and a Listing of 1970-Basis Duncan Socioeconomic and NORC Prestige Scores." Center for Demography and Ecology, Working Paper #75-1, University of Wisconsin, Madison.

Hartog, Joop. "Earnings and Capability Requirements." Institute for Research on Poverty Discussion Paper #495-78, University of Wisconsin, Madison, May 1978.

Lucas, Robert E. B. "Hedonic Wage Equations and Psychic Wages in the Returns to Schooling." American Economic Review (September 1977): pp. 549-558.

Sewell, W. H.; and Hauser, R. M. Education, Occupation and Earnings. New York: Academic Press, 1975.

Siegel, P. M. "Prestige in the American Occupational Structure." Doctoral dissertation, University of Chicago, 1971.

U. S. Bureau of the Census. "An Evaluation of the 1970 Census Occupational Classification." Technical Paper 41, February 1978.

Table A7.1

NUMBER AND WEIGHTED PERCENTAGES IN VARIOUS OCCUPATIONS, BY RACE AND SEX[a]
(For working household heads and wives)

Race/Sex Subgroup	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protective Service	Operatives, Transportation	Operatives, Non-Transportation	Laborers	Service Workers	Farmers	All
White Males	1.3% (55)	1.5% (60)	6.6% (251)	8.5% (303)	2.7% (102)	2.5% (114)	3.3% (132)	2.0% (69)	9.7% (414)	2.0% (98)	2.4% (112)	5.4% (246)	1.8% (91)	1.9% (73)	1.9% (81)	53.6% (2201)
Black Males	0.0% (5)	0.1% (13)	0.5% (35)	0.4% (42)	0.1% (15)	0.8% (82)	0.2% (23)	0.2% (18)	1.0% (164)	0.2% (38)	0.5% (112)	1.3% (213)	0.8% (169)	1.0% (137)	0.0% (4)	7.3% (1070)
White Females	2.8% (114)	0.9% (31)	3.0% (113)	2.0% (75)	0.5% (21)	11.5% (457)	2.1% (76)	0.2% (7)	0.2% (10)	0.0% (1)	0.2% (7)	4.0% (163)	0.2% (6)	5.7% (234)	0.0% (1)	33.3% (1314)
Black Females	0.3% (28)	0.1% (10)	0.2% (28)	0.2% (17)	0.1% (4)	1.5% (217)	0.0% (18)	0.0% (3)	0.1% (9)	0.0% (2)	0.0% (3)	1.0% (160)	0.1% (10)	2.2% (340)	0.0% (0)	5.8% (849)
All	4.5% (202)	2.6% (114)	10.3% (427)	11.1% (437)	3.3% (142)	16.4% (870)	5.6% (249)	2.4% (97)	11.1% (597)	2.3% (139)	3.2% (234)	11.7% (782)	2.8% (276)	10.8% (784)	2.0% (86)	100.0% (5436)

[a] Figures in parentheses are actual number of cases.

Note: The 1.3% in the first row, first column, means 1.3 percent of working white male household heads were teachers.

Table A7.2 (Page 1 of 3)

FREQUENCY OF JOB CHARACTERISTICS WITHIN OCCUPATION CATEGORIES[a]

(Percentages, for Working Household Heads and Wives.)

Characteristic	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Work Hierarchy																
Supervises 3 or More Employees	8.6 (14.5)	27.4 (27.1)	40.6 (46.9)	77.4 (80.6)	32.7 (35.1)	15.3 (26.2)	20.4 (27.2)	92.6 (91.2)	21.6 (22.3)	42.7 (45.6)	9.2 (8.7)	10.9 (16.3)	10.6 (12.9)	16.6 (27.7)	20.4 (20.8)	28.2 (37.7)
Has Say Over Others' Pay or Promotion	6.1 (15.5)	11.2 (15.1)	37.0 (47.3)	73.6 (77.7)	58.7 (62.8)	12.4 (22.0)	20.3 (25.2)	54.1 (54.3)	15.8 (15.9)	27.4 (28.6)	2.5 (1.1)	3.7 (5.4)	6.1 (7.9)	7.4 (18.2)	53.3 (53.3)	23.9 (34.1)
Boss Has a Boss	92.0 (94.6)	81.7 (90.6)	71.9 (68.1)	59.2 (57.8)	2.7 (1.4)	78.0 (84.8)	54.3 (57.4)	85.8 (88.4)	69.1 (69.0)	98.7 (98.5)	73.9 (75.0)	86.3 (86.6)	71.9 (70.6)	56.8 (69.3)	4.3 (4.0)	68.8 (66.5)
Advancement Possibilities																
Job Could Lead to Better Job or Promotion	68.9 (63.8)	76.2 (79.3)	78.0 (77.8)	77.8 (76.4)	40.5 (41.5)	73.3 (68.5)	71.2 (74.0)	72.8 (69.7)	71.4 (71.4)	87.0 (85.9)	46.4 (44.6)	54.8 (56.7)	55.6 (62.9)	53.4 (54.8)	37.0 (36.1)	66.7 (67.2)
Education Requirements																
Does Not Require at Least High School Education	0.7 (0.0)	3.3 (2.9)	2.8 (3.7)	8.7 (7.0)	32.7 (32.4)	7.6 (6.7)	25.0 (18.6)	24.8 (22.9)	35.9 (33.5)	3.7 (2.9)	48.7 (48.2)	49.1 (36.9)	67.6 (62.8)	51.4 (48.4)	51.5 (50.6)	25.5 (23.2)
Requires a College Degree	89.3 (84.9)	28.0 (33.1)	71.1 (81.3)	37.4 (38.0)	7.0 (4.3)	4.3 (8.0)	13.9 (20.1)	4.0 (4.8)	0.9 (1.0)	17.2 (19.6)	0.0 (0.0)	0.5 (1.1)	0.0 (0.0)	0.6 (1.5)	3.2 (5.3)	18.8 (22.4)

---

[a] Figures in parentheses apply to white male household heads only.

NOTE: The 8.6 in the first row, first column means that 8.6 percent of household heads and wives who were teachers supervised three or more employees.

Table A7.2 (Page 2 of 3)

Characteristic	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Training Requirements																
Requires Experience or Special Training	37.0 (46.6)	79.4 (76.0)	66.2 (62.9)	82.3 (83.7)	75.2 (77.5)	65.5 (58.2)	56.3 (65.4)	74.2 (75.0)	81.7 (82.5)	64.8 (67.9)	53.9 (52.8)	43.1 (50.9)	28.6 (36.0)	51.5 (41.5)	54.6 (54.5)	62.6 (67.5)
Time Needed for New Person to Become Fully Trained or Qualified																
Takes More than 1 Year to Become Trained	60.1 (68.8)	48.0 (61.3)	54.8 (65.3)	58.6 (67.2)	45.2 (51.8)	15.3 (25.7)	32.6 (47.2)	62.2 (67.9)	60.4 (62.4)	43.4 (48.1)	8.4 (8.7)	14.4 (23.5)	12.4 (17.9)	9.5 (18.3)	57.1 (57.1)	35.5 (50.6)
Pay Arrangements																
Salaried	93.5 (98.7)	61.6 (71.1)	73.4 (77.3)	83.0 (84.8)	20.7 (21.5)	57.2 (46.7)	35.0 (38.6)	69.2 (75.2)	16.3 (15.8)	90.2 (90.0)	15.4 (13.0)	7.1 (8.9)	18.8 (21.1)	24.0 (39.3)	8.5 (8.2)	44.7 (46.0)
Neither Salaried Nor Paid By the Hour	1.3 (0.0)	5.1 (6.1)	13.1 (16.0)	8.7 (8.5)	75.7 (75.3)	2.8 (2.4)	40.3 (52.7)	2.6 (1.6)	10.6 (10.8)	0.0 (0.0)	25.4 (26.4)	7.1 (4.9)	7.3 (5.7)	13.5 (10.8)	89.4 (89.9)	14.1 (18.2)
Overtime																
Get Overtime Pay	4.6 (5.7)	52.8 (50.8)	23.7 (19.0)	16.4 (14.0)	3.5 (3.6)	60.8 (71.0)	18.0 (11.2)	44.0 (39.7)	69.4 (70.3)	29.6 (30.4)	61.0 (63.8)	80.2 (86.6)	59.0 (56.5)	39.1 (60.6)	1.8 (1.3)	43.6 (41.3)
Pensions																
Covered By More Than 1 Pension (Including Social Security)	58.8 (62.1)	60.8 (68.4)	65.9 (70.7)	62.4 (67.0)	15.8 (18.3)	53.2 (64.1)	50.5 (62.6)	81.9 (83.1)	56.6 (57.5)	60.3 (60.5)	52.4 (61.2)	58.1 (70.4)	42.7 (44.9)	29.4 (49.1)	13.0 (13.2)	52.7 (59.9)
Vacation																
1 Week or Less Paid Vacation	2.7 (6.6)	4.0 (4.2)	2.2 (2.3)	5.7 (4.4)	3.4 (4.2)	9.0 (8.2)	9.7 (8.9)	5.2 (5.9)	15.7 (15.7)	1.1 (0.3)	11.6 (12.6)	24.1 (16.8)	16.8 (18.0)	17.7 (21.8)	3.6 (3.0)	10.7 (9.2)

Table A7.2 (Page 3 of 3)

Characteristic	Teachers	Tech-nicians	Profess-ionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Fore-men	Crafts-men	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
3 or More Weeks Paid Vacation	48.3 (41.1)	51.4 (63.7)	44.6 (47.1)	47.9 (51.0,	8.8 (10.7)	33.9 (50.1)	15.5 (20.2)	59.4 (59.6)	28.8 (30.0)	78.2 (79.9)	27.6 (28.6)	28.0 (39.4)	17.0 (17.6)	16.6 (24.6)	0.0 (0.0)	33.0 (38.2)
Flexibility of Work Load																
More Work Available on the Job	27.7 (38.8)	32.5 (31.3)	48.4 (52.1)	43.6 (44.3)	55.8 (56.7)	28.4 (28.0)	44.1 (44.6)	41.4 (42.3)	34.6 (35.7)	41.7 (44.4)	39.8 (39.4)	29.2 (31.4)	24.8 (25.8)	32.3 (31.6)	57.0 (56.5)	36.6 (40.9)
Could Work Less for Less Pay	24.4 (27.4)	15.9 (15.9)	27.4 (31.0)	38.5 (40.9)	39.4 (38.6)	19.1 (18.5)	39.9 (43.4)	33.4 (33.1)	25.5 (25.9)	24.9 (28.2)	33.5 (31.7)	18.5 (20.3)	14.4 (17.4)	22.4 (20.4)	61.8 (62.6)	26.8 (31.0)
Type of Employer																
Employer Is a Government	77.3 (85.3)	24.6 (27.5)	29.1 (22.3)	15.5 (13.4)	2.0 (2.4)	23.4 (25.6)	0.1 (0.0)	8.2 (5.6)	11.6 (11.0)	98.9 (98.8)	17.6 (13.1)	4.4 (4.5)	14.7 (12.2)	19.9 (27.5)	0.6 (0.6)	20.1 (17.4)
Self-Employed	1.0 (0.0)	2.3 (3.8)	14.7 (18.8)	12.1 (14.7)	95.2 (95.9)	2.1 (2.4)	11.7 (15.4)	0.0 (0.0)	8.6 (8.6)	0.0 (0.0)	2.2 (1.0)	1.0 (1.9)	2.0 (0.7)	7.9 (6.6)	76.6 (76.8)	10.7 (15.5)
Industry																
Service Industry	98.3 (98.2)	43.5 (24.1)	58.5 (47.2)	26.0 (24.3)	17.8 (13.8)	28.4 (12.9)	6.9 (5.4)	9.6 (7.7)	16.5 (16.9)	0.8 (0.1)	9.8 (6.9)	4.1 (3.6)	8.2 (8.8)	68.3 (55.7)	0.0 (0.0)	30.6 (20.7)
Manufacturing Industry	0.0 (0.0)	22.7 (32.9)	18.6 (25.8)	16.9 (19.2)	6.2 (6.8)	14.5 (25.7)	7.3 (11.7)	55.6 (53.2)	31.5 (31.5)	0.0 (0.0)	22.9 (25.7)	82.7 (77.3)	20.1 (18.5)	3.2 (10.3)	0.0 (0.0)	23.5 (27.0)
Union Status																
Job With Union Contract	39.5 (45.9)	15.5 (19.3)	11.4 (7.1)	7.8 (7.9)	0.5 (0.0)	19.9 (36.2)	10.0 (9.2)	19.7 (19.2)	44.8 (45.4)	12.6 (10.8)	46.7 (53.0)	51.6 (61.2)	32.8 (34.1)	17.3 (27.5)	0.0 (0.0)	24.1 (26.0)

Table A7.3 (Page 1 of 3)

FREQUENCY OF WORKER OR ENVIRONMENTAL CHARACTERISTICS WITHIN OCCUPATION CATEGORIES[a]

(Percentages, for Working Household Heads and Wives.)

Characteristic	Teachers	Tech-nicians	Profess-ionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Fore-men	Crafts-men	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Of the Worker:																
Experience																
Worked More Than 10 Years Since Age 18	53.2 (71.7)	62.3 (72.8)	67.0 (71.6)	79.7 (84.5)	84.2 (87.1)	51.1 (67.7)	64.5 (72.0)	87.0 (86.9)	71.7 (72.1)	43.0 (45.3)	64.5 (63.8)	63.1 (68.1)	56.2 (50.9)	55.2 (58.1)	88.0 (88.1)	64.2 (72.7)
Worked Less Than 3/4 of Years Since Age of 18	34.2 (10.7)	18.3 (6.6)	25.9 (18.6)	12.4 (3.9)	18.3 (10.6)	34.1 (7.8)	25.7 (6.8)	5.2 (1.7)	4.7 (3.9)	5.8 (5.7)	9.6 (5.1)	23.3 (5.6)	15.3 (10.0)	33.6 (8.9)	8.1 (7.2)	21.7 (7.4)
Work Horizon																
Plans to Quit Working in Next Few Years	11.3 (6.9)	4.8 (2.2)	6.3 (3.8)	3.5 (2.7)	4.4 (3.7)	8.4 (4.5)	7.5 (4.5)	9.6 (8.9)	3.1 (2.6)	5.3 (6.0)	5.3 (5.9)	5.8 (5.0)	4.2 (3.2)	9.6 (11.9)	0.0 (0.0)	6.3 (4.1)
Race/Sex																
Black Male	1.1	4.2	4.7	3.8	2.0	5.1	3.2	6.4	9.0	10.3	17.2	11.2	29.8	9.6	0.8	7.3
White Female	63.1	33.8	29.3	18.1	13.7	70.4	36.5	8.9	1.9	0.7	6.2	34.5	5.5	52.8	1.0	33.4
Black Female	6.7	3.1	1.7	1.7	2.3	9.1	0.7	0.3	0.9	1.3	0.5	8.4	2.1	20.4	0.0	5.8

---

[a] Figures in parentheses apply to white male household heads only.

NOTE: The 53.2 in the first row, first column means that 53.2 percent of household heads and wives who were teachers had worked more than 10 years since age 18.

Table A7.3 (Page 2 of 3)

Characteristic	Teachers	Tech-nicians	Profess-ionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Fore-men	Crafts-men	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Age																
Under Age 30	39.7 (26.9)	31.4 (28.3)	25.0 (23.2)	18.0 (17.1)	13.6 (12.3)	39.9 (37.3)	29.8 (31.8)	12.2 (13.1)	31.2 (31.1)	60.5 (58.6)	32.5 (35.5)	32.2 (35.0)	41.7 (48.1)	32.1 (44.5)	13.5 (13.5)	30.7 (28.5)
Aged 60 or Older	6.2 (8.0)	2.4 (4.1)	7.8 (8.3)	5.8 (5.3)	21.9 (21.3)	7.2 (4.6)	12.3 (8.4)	14.1 (12.0)	7.0 (7.0)	0.0 (0.0)	5.6 (3.6)	7.9 (7.9)	12.0 (12.3)	13.6 (17.4)	22.2 (22.6)	8.8 (8.5)
Education																
Less Than High School Degree	0.7 (0.0)	3.3 (4.6)	2.9 (3.9)	6.9 (6.2)	29.5 (27.1)	9.6 (17.0)	14.0 (7.2)	26.2 (26.2)	38.2 (37.3)	10.0 (9.1)	48.2 (42.7)	48.8 (38.4)	55.6 (48.1)	39.5 (24.7)	44.3 (44.4)	23.5 (22.1)
College Degree	92.9 (92.8)	27.2 (31.2)	71.1 (78.8)	34.7 (39.0)	16.3 (17.8)	7.7 (11.6)	20.9 (31.9)	1.4 (1.5)	3.3 (2.8)	13.1 (15.0)	0.5 (0.6)	2.2 (3.9)	0.4 (0.7)	0.9 (3.4)	11.5 (10.6)	20.4 (24.6)
Marital Status																
Single	19.5 (5.8)	11.5 (9.0)	10.8 (7.8)	4.6 (3.3)	2.8 (2.2)	11.7 (8.4)	7.6 (8.5)	2.7 (0.7)	5.8 (6.2)	15.6 (15.6)	6.6 (7.7)	6.6 (6.5)	9.1 (9.4)	14.1 (22.2)	1.7 (1.7)	9.1 (6.8)
Widowed, Divorced or Separated	7.5 (2.1)	19.4 (12.5)	10.7 (8.2)	10.3 (6.3)	9.4 (7.5)	18.1 (1.5)	14.2 (5.5)	3.4 (1.7)	6.1 (5.0)	9.2 (8.2)	9.4 (10.1)	12.7 (4.1)	8.1 (4.1)	24.9 (9.8)	3.1 (3.1)	12.9 (6.0)
Of the Environment:																
Region																
Northeast	25.2 (32.8)	23.6 (29.6)	24.8 (24.7)	28.6 (30.5)	19.1 (18.1)	23.4 (29.2)	24.7 (27.8)	18.0 (18.2)	19.6 (21.4)	19.4 (22.0)	23.1 (24.4)	20.1 (21.5)	8.5 (7.8)	22.2 (42.4)	1.5 (1.6)	22.1 (24.0)
South	25.1 (16.1)	31.5 (33.4)	25.3 (22.2)	24.3 (22.1)	31.5 (30.7)	27.8 (25.4)	29.1 (27.0)	37.2 (34.1)	29.8 (28.5)	38.5 (35.4)	33.2 (26.8)	33.1 (27.9)	47.8 (40.8)	29.1 (10.1)	33.6 (33.4)	29.6 (26.8)
West	10.6 (13.0)	19.0 (11.7)	19.5 (19.0)	16.8 (15.2)	20.8 (21.2)	23.6 (21.9)	19.1 (17.9)	11.0 (11.1)	17.4 (17.6)	28.2 (28.5)	18.6 (20.6)	11.9 (12.3)	20.3 (19.1)	21.6 (23.7)	12.8 (13.0)	18.5 (17.4)

Table A7.3 (Page 3 of 3)

Characteristic	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
City Size																
City of 500,000 or More	32.7 (34.2)	38.2 (33.7)	46.2 (43.4)	40.8 (43.3)	26.8 (25.3)	37.2 (30.3)	39.3 (40.4)	33.3 (33.2)	30.7 (27.6)	22.9 (22.3)	27.6 (26.1)	22.1 (18.7)	12.4 (8.0)	36.1 (38.9)	2.4 (2.1)	33.4 (31.1)
City of Less Than 10,000	15.8 (20.6)	2.6 (3.4)	4.8 (5.5)	9.0 (8.3)	17.5 (15.1)	7.1 (6.8)	12.5 (12.3)	15.0 (16.2)	15.4 (16.3)	7.3 (7.8)	23.5 (24.5)	18.9 (17.5)	22.4 (24.3)	15.2 (11.9)	53.6 (54.5)	13.2 (14.3)
Local Unemployment Rate																
County Unemployment Rate Under 4%	17.9 (20.4)	7.5 (6.4)	7.2 (8.0)	9.1 (8.0)	17.4 (17.0)	9.5 (8.3)	11.3 (10.6)	12.0 (11.0)	15.6 (16.8)	4.9 (4.6)	10.1 (11.2)	15.7 (17.6)	16.2 (24.4)	10.6 (7.9)	53.2 (54.2)	12.4 (13.8)
County Unemployment Rate 9% or Higher	15.8 (15.2)	33.5 (28.9)	31.8 (33.7)	33.0 (31.5)	28.3 (28.8)	30.2 (34.6)	31.1 (31.4)	31.0 (31.6)	26.7 (26.3)	36.6 (34.1)	30.4 (32.3)	31.1 (32.7)	25.2 (18.0)	37.1 (37.0)	9.5 (9.6)	30.2 (29.6)

Table A7.4 (Page 1 of 3)

FREQUENCY OF COMBINED JOB/WORKER CHARACTERISTICS WITHIN OCCUPATION CATEGORIES[a]

(Percentages, for Working Household Heads and Wives.)

Characteristic	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Wage Rate																
Earned More Than $10 per Hour	2.8 (9.7)	8.9 (15.0)	19.1 (25.6)	23.0 (25.8)	5.7 (5.7)	0.4 (2.7)	7.9 (12.3)	12.3 (14.6)	3.4 (3.7)	1.5 (1.7)	0.4 (0.0)	0.2 (0.5)	0.1 (0.0)	0.0 (0.0)	6.0 (6.1)	6.4 (11.1)
Earned Less Than $5 per Hour	36.7 (12.2)	36.6 (19.3)	19.8 (12.5)	25.2 (17.0)	66.4 (63.5)	69.8 (34.9)	52.9 (31.5)	20.6 (11.9)	34.8 (32.9)	45.1 (41.5)	53.2 (46.2)	65.3 (43.7)	73.7 (69.5)	90.4 (74.2)	79.4 (79.0)	52.2 (34.0)
Match Between Skill of Worker and Skill Needed for Job																
Has Skills Not Used in Present Job	48.0 (53.3)	57.7 (58.9)	54.1 (52.8)	49.9 (48.7)	42.2 (44.9)	52.9 (61.7)	57.9 (58.6)	51.5 (53.4)	56.4 (58.2)	64.1 (61.7)	57.0 (56.3)	52.9 (64.1)	52.1 (59.4)	50.7 (72.7)	26.8 (25.7)	52.5 (55.3)
Tenure with Present Employer																
Worked for Present Employer 1 Year or Less	12.8 (5.2)	11.8 (4.2)	12.5 (8.8)	11.1 (9.6)	1.1 (0.7)	18.7 (10.2)	25.4 (21.7)	3.6 (2.7)	18.1 (18.2)	6.0 (5.7)	19.0 (19.6)	16.4 (14.3)	25.0 (23.2)	23.4 (23.8)	1.7 (1.6)	16.0 (12.3)
Worked for Present Employer 5 Years or More	52.2 (76.2)	60.6 (65.0)	46.8 (45.5)	52.3 (53.9)	1.7 (2.0)	45.3 (54.1)	41.9 (43.6)	81.5 (83.2)	48.3 (49.2)	52.6 (55.1)	51.2 (49.1)	53.2 (58.0)	41.8 (38.5)	35.4 (31.0)	15.6 (15.5)	46.0 (48.2)

---

[a] Figures in parentheses apply to white male household heads only.

NOTE: The 2.8 in the first row, first column means 2.8 percent of household heads and wives who were teachers earned more than $10 per hour.

Table A7.4 (Page 2 of 3)

Characteristic	Teachers	Technicians	Professionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Foremen	Craftsmen	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Work Load																
Worked More Than 40 Weeks on Main Job in 1975	21.0 (31.1)	87.9 (86.7)	85.4 (90.7)	94.5 (96.0)	87.6 (89.9)	83.2 (86.3)	82.2 (89.7)	98.1 (97.8)	78.7 (80.3)	97.5 (97.3)	79.0 (82.8)	74.6 (79.0)	69.0 (71.8)	73.1 (79.3)	94.1 (94.2)	79.8 (85.8)
Worked Less Than 35 Hours per Week on Main Job in 1975	24.1 (17.4)	9.2 (0.0)	12.2 (6.6)	5.5 (1.2)	12.2 (10.8)	14.2 (4.0)	18.1 (5.0)	0.0 (0.0)	2.8 (2.6)	5.2 (5.8)	11.0 (6.0)	4.9 (1.9)	8.4 (6.0)	27.1 (8.6)	11.4 (10.6)	11.7 (4.5)
Worked More Than 40 Hours per Week on Main Job	32.0 (51.8)	19.8 (24.3)	44.5 (56.3)	62.2 (69.8)	69.1 (70.3)	12.3 (29.5)	43.0 (60.6)	57.7 (64.1)	37.2 (39.0)	49.9 (49.6)	52.8 (60.6)	26.4 (37.0)	37.7 (44.3)	18.7 (30.2)	74.4 (75.2)	36.1 (51.7)
Worked More Than 40 Hours per Week on All Jobs	53.5 (82.2)	51.1 (62.3)	63.6 (75.6)	76.1 (81.6)	72.1 (75.8)	44.9 (65.2)	56.4 (75.1)	78.4 (81.2)	71.6 (72.2)	74.2 (75.3)	73.7 (78.6)	63.3 (75.1)	66.1 (71.1)	39.4 (62.3)	84.4 (85.2)	60.7 (75.2)
Had Second Job	33.5 (57.2)	14.0 (18.4)	21.6 (23.9)	15.9 (17.0)	12.6 (13.4)	11.5 (20.9)	20.3 (22.8)	24.0 (21.6)	22.3 (22.6)	20.0 (20.3)	15.3 (13.9)	13.6 (19.0)	19.1 (27.4)	12.4 (14.9)	30.7 (29.7)	17.4 (21.3)
Wanted More Work	10.5 (12.7)	21.0 (24.1)	12.9 (13.5)	7.4 (8.6)	13.4 (14.4)	18.0 (33.5)	14.4 (15.7)	6.8 (6.6)	30.1 (29.5)	18.3 (18.0)	28.8 (28.2)	33.1 (37.5)	37.9 (34.6)	27.0 (41.5)	3.1 (2.9)	20.1 (21.3)
Wanted Less Work	2.7 (2.9)	5.4 (0.0)	5.3 (4.3)	4.3 (3.4)	0.0 (0.0)	7.4 (1.8)	4.2 (1.7)	5.7 (6.6)	4.2 (4.5)	4.0 (4.4)	2.3 (2.8)	5.7 (3.2)	0.9 (1.1)	6.9 (5.4)	3.3 (3.3)	5.0 (3.4)
Absence from Work																
Missed 3 or More Weeks Due to Illness of Self or Others	3.3 (5.9)	12.4 (14.4)	8.0 (4.3)	3.2 (2.4)	8.9 (9.2)	14.2 (21.3)	11.1 (7.2)	5.9 (5.3)	14.4 (14.0)	6.4 (6.7)	15.4 (13.8)	16.6 (13.8)	9.6 (9.1)	17.2 (15.2)	6.8 (6.8)	11.5 (9.5)

Table A7.4 (Page 3 of 3)

Characteristic	Teachers	Tech-nicians	Profess-ionals	Managers, Emp.	Managers, Self-Emp.	Clerical	Sales Workers	Fore-men	Crafts-men	Protect. Service	Operatives, Transp.	Operatives, Non-Transp.	Laborers	Service Workers	Farmers	All
Took 1 Week or Less Vacation	4.5 (6.3)	9.4 (7.6)	8.4 (9.2)	15.0 (15.2)	14.4 (12.9)	13.6 (14.0)	18.9 (20.6)	8.2 (9.3)	14.3 (14.8)	7.6 (5.7)	20.9 (22.5)	18.1 (15.0)	13.7 (15.1)	18.7 (18.6)	30.9 (29.9)	14.5 (14.5)
Took 3 or More Weeks Vacation	87.2 (89.1)	50.5 (54.4)	52.0 (52.3)	39.7 (40.8)	29.3 (28.2)	36.7 (42.0)	24.1 (24.2)	53.9 (54.7)	28.3 (29.8)	57.1 (56.5)	23.4 (21.8)	25.4 (30.9)	20.0 (17.9)	25.7 (25.3)	12.2 (12.4)	36.4 (37.1)
Unemployed 3 or More Weeks	5.6 (3.2)	6.6 (7.7)	6.0 (3.4)	4.0 (2.9)	5.1 (5.3)	10.6 (9.1)	11.8 (10.9)	5.1 (5.2)	24.9 (23.8)	2.9 (2.5)	19.4 (21.0)	24.4 (20.9)	35.1 (32.4)	15.8 (24.3)	2.4 (2.4)	13.2 (12.2)
Union Status																
Union Member of Union Job	33.0 (45.9)	14.5 (19.3)	8.1 (5.4)	4.4 (4.9)	0.5 (0.0)	14.6 (32.5)	7.8 (7.3)	16.7 (15.6)	42.4 (43.3)	10.4 (9.2)	43.3 (49.7)	48.3 (59.0)	30.6 (31.4)	14.9 (23.1)	0.0 (0.0)	20.9 (23.9)

Chapter 8

SUMMARY OF OTHER RESEARCH

In this chapter we summarize some recent analyses of the Panel Study of Income Dynamics data being conducted here at The University of Michigan and elsewhere. A similar summary appeared in Volumes II, III, IV, V, and VI, and here we attempt to bring up to date the list of research completed and in progress.

These analyses are in various stages of completion. Some have already been published in professional journals, some are currently at the "working paper" stage, and the remainder are just getting started.

The list of analyses is certainly not complete. The task of contacting everyone working with the Panel Study data is impossible, but our hope is that the following summaries will help to coordinate future research.

Atwater, Donald M. Occupational Selection Study.

Carlin, Alan; Ben-David, Shaul; Brookshire, David S.; Crocker, Thomas D.; d'Arge, Ralph C.; Kneese, Allen V.; and Schulze, William. Methods Development for Assessing Tradeoffs in Environmental Management: Executive Summary.

Cohn, Richard M. The Effect of Employment Status Change on Self-Attitudes.

DaVanzo, Julie. Does Unemployment Affect Migration?--Evidence from Microdata.

Dickey, John W. Work in progress.

Duncan, Greg J., and Morgan, James N. Sense of Efficacy and Changes in Economic Status--A Comment on Andrisani.

Edwards, Karen S. The Interrelationship between Fertility Pattern and Type of Occupation of Working Wives.

Greenberg, David, and Wolf, Douglas. Work in progress.

Hall, Robert E. Work in progress.

Hamermesh, Daniel. New Estimates of the Incidence of the Payroll Tax.

Hamermesh, Daniel S. Entitlement Effects, Unemployment Insurance, and Employment Decisions.

Hanushek, Eric A., and Quigley, John M. Implicit Investment Profiles and Intertemporal Adjustment of Relative Wages.

Harris, Richard J. Recent Mobility: A Study of Migration and Social Mobility between 1968 and 1973.

Heckman, James J. Simple Statistical Models for Discrete Panel Data Developed and Applied to Test the Hypothesis of True State Dependence Against the Hypothesis of Spurious State Dependence.

Heckman, James J. Heterogeneity and State Dependence in Dynamic Models of Labor Supply.

Heckman, James J. A Dynamic Model of Female Labor Supply.

Heckman, James J., and MaCurdy, Tom. A Dynamic Model of Female Labor Supply.

Hill, Martha S. Family Status and Labor Patterns.

Hutchins, Robert M. Welfare, Remarriage, and Marital Search.

Leigh, J. Paul. Earnings, Risk, and the Wage Structure of Industry.

Lillard, Lee A., and Willis, Robert J. Dynamic Aspects of Earning Mobility.

Moen, Phyllis Elkins. Family Impacts of the 1975 Recession: Unemployment among Families with Children.

Moore, Kristin A. The Consequences of Age at First Childbirth: Final Research Summary.

Oi, Walter. Three Paths from Disability to Poverty.

Salkever, David. Effects of Children's Health on Maternal Hours of Work: A Preliminary Analysis.

Shorrocks, Anthony F. Income Stability in the United States.

Tropman, John E., and Dow, Gregg. Work in progress.

Wright, Erik. Race, Class, and Income Inequality.

OCCUPATIONAL SELECTION STUDY

Donald M. Atwater, University of California, Los Angeles
(Published in Abstract, Volume VII, 1978.)

The occupational selection patterns for women entering full-time jobs between 1971 and 1975 were examined as part of a labor market analysis study for a private sector corporation. Standard Bureau of Census major occupational groupings and full-time work week definitions were used.

Persons who were part-time workers in year t and full-time workers in year t+1 were tracked separately from persons who were not in the labor force in year t but became full-time workers in year t+1.

The analysis concluded that women entering full-time jobs in this period tended to select positions in more traditional occupational groupings when compared to current full-time workers. In particular, for jobs involving outside work with the physical skill requirements, slightly fewer women (.0022 as a percentage of the total entrants) entered such jobs compared to the percentage of full-time working women (.0050) who held such jobs in both years (t and t+1). Such differences are not statistically different.

METHODS DEVELOPMENT FOR ASSESSING TRADEOFFS IN ENVIRONMENTAL MANAGEMENT

Alan Carlin, University of Wyoming
Shaul Ben-David, University of New Mexico
David S. Brookshire, University of Wyoming
Thomas D. Crocker, University of Wyoming
Ralph C. d'Arge, University of Wyoming
Allen V. Kneese, University of New Mexico
William Schulze, University of Southern California
Richard Adams, University of Wyoming

The effects of pollution on morbidity were estimated using data on health and the time and budget allocations from the Panel Study of Income Dynamics. Generalized measures of acute illness, stated in terms of annual workdays ill, and chronic illness, stated in terms of years of illness duration, were available. The measures of illness were substantially less than ideal. For example, individuals who died between the reference year of the interview and the time of the interview are not included, and years of illness duration are defined in terms of dissimilar multiples of years rather than the actual number of years.

For most of the dose-response expressions estimated in this part of the study, air pollution appears to be significantly associated with increased time spent being acutely or chronically ill. In addition, air pollution appears to influence labor productivity, where the reduction in productivity is measured by the earnings lost due to reductions in work time. The reduction in productivity due to air pollution-induced chronic illness seems to be much larger than any reductions due to air pollution-induced acute illness.

THE EFFECT OF EMPLOYMENT STATUS CHANGE ON SELF-ATTITUDES

Richard M. Cohn, University of Wisconsin

(Published in Social Psychology, 41, 1978, pp. 81-92.)

The effect of employment status change on self-attitudes "is conditional upon (1) the amount of concomitant change in social role performance, (2) the relative importance of the status change to the individual, and (3) the individual's attribution of cause for the status change." (Concomitant change is indicated by level of housework activity and relative contribution to family income. Attribution is indicated by level of local area unemployment.) ". . . with reemployment, the decrement in satisfaction with self initially experienced . . . is removed, after taking into account residual effects of unemployment on familial role performance."

DOES UNEMPLOYMENT AFFECT MIGRATION?--EVIDENCE FROM MICRODATA

Julie DaVanzo, Rand Corporation, Santa Monica, California
(Published in Review of Economics and Statistics, 60, November 1978, pp. 504-514.)

Families whose heads are unemployed or are dissatisfied with their jobs are more likely to move than those whose heads are not searching for different jobs . . . Recent arrivals to an area who cannot find acceptable jobs are especially prone to migrate (again). Furthermore, local economic conditions (origin unemployment rates) do affect outmigration, but only within the subset of people most seriously affected by them--the unemployed. In addition, the unemployed and other persons looking for work are more responsive to the other economic determinants of migration (family income, origin wage rates, and expected earnings increases) than persons apparently satisfied with their jobs. (Based on a 1976 analysis and monograph which became Rand Monograph No. 48, U.S. Department of Labor, 1977.)

WORK IN PROGRESS

John W. Dickey, Office of Urban Development, Agency for International Development, Department of State, Washington, D. C. (On leave from Virginia Tech.)

John W. Dickey is planning to study the impact of transfer programs on the transportation expenditures and the travel (mobility) of the poor.

SENSE OF EFFICACY AND CHANGES IN ECONOMIC STATUS--A COMMENT ON ANDRISANI

Greg J. Duncan, Institute for Social Research, University of Michigan, Ann Arbor
James N. Morgan, Institute for Social Research, University of Michigan, Ann Arbor
(Forthcoming in Journal of Human Resources.)

In a recent article Paul Andrisani (1977) used data from the National Longitudinal Survey (NLS) panels of young and middle-aged men and found that "internal-external" attitudes related to subsequent changes in economic status. The Panel Study of Income Dynamics data also contain attitudinal data, but our initial attempts to relate them to changes in economic status have not been as successful as Andrisani's. The authors attempted to duplicate Andrisani's analysis, regressing change in earnings on measures of initial internal-external control, using Panel Study data.

Although this replication of Andrisani's analysis showed somewhat larger effects of initial efficacy on subsequent changes in earnings in the Panel Study data than in the NLS data and even larger effects when the time period was extended, Duncan and Morgan believe that the weight of the evidence does not support Andrisani's conclusion that "the data suggest that an attitudinal change among both whites and blacks with "external" attitudes would result in greater initiative and more successful labor market experience" (p. 325). Only one of the four coefficients on measures of initial internal-external control estimated with Panel Study data was statistically significant at conventional levels and, more important, the size of the correlation between efficacy and earnings change depended heavily on the definition of earnings, the measurement of change, and the population subgroups examined.

THE INTERRELATIONSHIP BETWEEN FERTILITY PATTERNS AND TYPE OF OCCUPATION OF WORKING WIVES

Karen S. Edwards, University of Vermont

The strong inverse relationship between female employment and family size is often explained as alternate need gratification. The purpose of this study is to explore one aspect of this alternate need theory.

In reviewing the literature, a number of motivations for having children can be found. One of the major values reported by women is the opportunity to affiliate and nurture. This investigation was initiated to determine if specific occupations which vary in terms of their approximation of mothering roles, specifically nurturance and affiliation, correlate differentially with fertility patterns of the employed wife.

It was hypothesized that women employed in "nurturant" occupations would demonstrate lower fertility and have fewer opportunities to nurture and affiliate at home as compared to other employed women of the same cohort group. Nurturant occupation was defined as employment in personal, health, and educational service occupations. It was found that these work activities were likely to be more rewarding in terms of opportunities to nurture and affiliate with others than employment in manufacturing, clerical, or sales occuations. The relationship between fertility patterns and employment in these occupations was assessed using multiple linear regression analyses so that the effects of extraneous demographic variables could be controlled simultaneously.

A sample of stably married employed wives under the age of 53 was divided into three cohort age groups for separate analyses. These wives participated in the Panel Study on Income Dynamics from its inception through the wife's interview in the ninth year of data collection.

The results of this investigation indicate that employment in the "nurturant" occupations is not a significant variable in predicting fertility patterns. The hypothesized causal path from work gratifications to childbearing decisions was not supported. Opportunities to nurture and affiliate at home reflected in the number of children under 18 in the family unit was a significant variable in predicting employment in a nurturant occupation for the youngest cohort group, but the direction of the relationship was opposite that expected by the proposed model.

WORK IN PROGRESS
David Greenberg, Department of Health, Education and Welfare, Washington D.C.
Douglas Wolf, Department of Health, Education and Welfare, Washington D.C.

Greenberg and Wolf are currently using data from the Panel Study of Income Dynamics to examine how parents' marital status (married, separated, divorced, widowed) affects the amount of time and monetary resources that are available to their children and how, in turn, these resource constraints ultimately influence the children's labor market performance as adults.

WORK IN PROGRESS
Robert E. Hall, Stanford University

Hall has launched a project to study the relation between food consumption and income using data from the Panel Study of Income Dynamics. This is part of a joint research program--with Professor Frederic Mishkin at the University of Chicago--which is applying the theory of rational expectations to individual consumption behavior.

They have developed a simple empirical version of the life-cycle/permanent-income model of consumption. Income is hypothesized to have three components: a deterministic life-cycle component, a random component measuring lifetime prospects, and a random transitory component. The statistical work involves inferring the parameters of the model from the joint movements of income and consumption. The econometric techniques are related to those developed by Arthur Goldberger and Gary Chamberlain.

They say they have obtained some encouraging preliminary results and expect to have a report ready for circulation at the end of the summer of 1979.

NEW ESTIMATES OF THE INCIDENCE OF THE PAYROLL TAX
Daniel Hamermesh, Michigan State University

This study takes a new approach to empirical examination of tax incidence, basing the empirical work on equations describing individuals' earnings. The data, covering 587 male workers, are for 1973 from the Panel Study of Income Dynamics. The presence of data for these men for 1967-1972 enables us to estimate the time path of shifting. The shifting process is fairly rapid; nearly 80 percent of that part of the tax that is shifted is done within one year of its imposition. The results show that little more than one-third of the employer's OASDHI contribution is shifted back onto labor. The rest is either passed on to consumers or borne entirely by owners of capital.

ENTITLEMENT EFFECTS, UNEMPLOYMENT INSURANCE, AND EMPLOYMENT DECISIONS
Daniel S. Hamermesh, Michigan State University

Many studies have identified the work disincentive effects of unemployment insurance. This paper points out the entitlement effect of this and other social insurance programs on employment, as the risks of labor-market participation are reduced by the existence of unemployment benefits. This employment-increasing effect can offset the disincentive effect, with the net impact on employment becoming an empirical issue. Using Panel Study data on a sample of married women for 1971, Hamermesh finds that higher unemployment insurance benefits have a slight negative effect on employment. The entitlement effect on employment, however, is generally positive and significant, suggesting that the provisions of social insurance induce increased labor-force participation among women who would otherwise remain out of the labor force.

IMPLICIT INVESTMENT PROFILES AND INTERTEMPORAL ADJUSTMENT OF RELATIVE WAGES
Eric A. Hanushek, Yale University
John M. Quigley, Yale University
(Published in American Economic Review, 68, March 1978, pp. 67-79.)

This article extends the model of human capital accumulation to distinguish between the effects of labor market experience and aging on observed earnings profiles, to incorporate other individual differences explicitly, and to incorporate short-term dynamics. On this basis, the implied postschool investment profiles are then estimated, and the impact of aggregate economic conditions on earnings profiles is considered. Hanushek and Quigley use individual person plus random error terms, the former being smaller for blacks, indicating more transitory income.

MORE EXACTING TESTS OF THE OJT INVESTMENT MODEL

Eric A. Hanushek, Yale University
John M. Quigley, Yale University

(Paper prepared for US/UK Economics of Education Exchange Programme Meeting, Cambridge, England--March 19-23, 1978.)

The determination of earnings by individuals has historically been a topic of considerable research and lively debate by economists. This subject has been approached from a variety of vantage points. Currently the dominant model of earnings determination concentrates upon investment in acquiring skills by individuals and relates earnings to differences in the "human capital" stock of individuals.

The empirical results of this investigation are remarkably consistent for different samples and are robust to alternative specifications of the model. The results provide no support for the theoretical model.

RECENT MOBILITY: A STUDY OF MIGRATION AND SOCIAL MOBILITY BETWEEN 1968 AND 1973

Richard J. Harris, University of Texas at San Antonio

(To be published in Geographic Mobility, Employment Change and Income Change: A Study of Status Attainment.)

Integrating aspects of the "human capital" and "status attainment" models of individual achievement, this study specifically focuses on the relationship between migration and the attainment of occupational and income levels, attempting to determine the role that migration plays in the stratification system of the United States. The general model advanced for this analysis is that community structure and individual factors predetermine to a large extent the possibilities for individual attainment. Differential access to rewards and privileges is determined by the relative importance of ascribed, particularistic and achieved bases of attainment. Particularistic factors refer to differences in opportunity associated with residing in different types of communities or areas that vary in terms of size, local wage levels or availability of employment. The ascriptive and achievement dimensions determine attainment in a given context, and the particularistic dimension sets the limits on the range of opportunities available. Migration is viewed as an intervening mechanism for altering the particularistic dimension, alleviating at least one aspect of social inequality--the inequality of opportunity associated with residing in one type of community rather than another.

The data used in this analysis are obtained from the first seven years of the Panel Study of Income Dynamics. The eligible sample is restricted to male heads of household in the labor force in 1968, 20 to 57 years of age, who remain in the sample as heads of household through 1974, and who do not disengage from the labor force.

The results of this study demonstrate that there are benefits associated with migration in addition to those which would be expected on the basis of differential migrant selectivity. In the models of previous migration experience, substantial occupational and income advantages were noted for respondents who engaged in migration which resulted in a change of community structure, particularly movement from smaller to larger communities. Between 1968 and 1973, migrants from low wage to high wage areas and between large metropolitan areas attained higher incomes than comparable non-migrants. In addition, migrants were much more likely to encounter job improvement during the period. Models to account for migration experience are also developed, indicating that age, home ownership, duration of residence and previous migration are the most important factors in explaining current migration experience. Respondents of higher socio-economic status are more likely to migrate and some evidence is presented illustrating a positive relationship between distance of migration and socio-economic status.

SIMPLE STATISTICAL MODELS FOR DISCRETE PANEL DATA DEVELOPED AND APPLIED TO TEST THE HYPOTHESIS OF TRUE STATE DEPENDENCE AGAINST THE HYPOTHESIS OF SPURIOUS STATE DEPENDENCE

James J. Heckman, University of Chicago
(Forthcoming, Symposium Issue of Annals de INSEE, Paris, 1978; proceedings of a conference on Panel Data held in Paris, August 1977.)

This paper develops statistical models for the analysis of discrete longitudinal data. Many interesting stochastic processes are generated by a model in which discrete events arise from a dichotomization of latent continuous variables. The latent variables are given various dynamic specifications which give rise to alternative stochastic processes. This research investigates probabilities of runs patterns for temporal sequences of discrete events generated by these models. The simple models are used to investigate whether conditional relationships between the probability of experiencing an event and previous experience of the event arise from spurious correlation or a real effect of the experience. Simple runs tests and generalized linear probability estimators are developed and applied to test the hypothesis of no real effect. Data from the Panel Survey of Income Dynamics are used in the empirical work. When observed heterogeneity is controlled, there is considerable evidence of a real effect of past experience on current participation probabilities.

HETEROGENEITY AND STATE DEPENDENCE IN DYNAMIC MODELS OF LABOR SUPPLY

James J. Heckman, University of Chicago
(Forthcoming in International Economic Review.)

This paper develops a new econometric methodology for the analysis of discrete panel data and applies it to a model of the dynamic labor supply decisions of married women. The data base for this work is the Panel Study of Income Dynamics. The model permits the analyst to distinguish between two conceptually distinct reasons why people who have experienced an event in the past are more likely than those who have never experienced the event to experience the event in the future. One reason is that people differ in unobserved factors that persist over time. This reason is termed "heterogeneity" in the literature. A second reason is that the actual experience of the event alters behavior. This is termed "state dependence."

In the paper, very general characterizations of both "heterogeneity" and "state dependence" are given. Empirical work is performed on the labor supply decisions of a sample of continuously married women taken from the first eight years of the Panel Survey of Income Dynamics. The major empirical findings are: (1) For women past their childbearing years, there is considerable evidence of both heterogeneity and state dependence. (2) For such women, the effect of state dependence is to widen initial differences in the probabilities of labor force participation. (3) For women in the childbearing years, there is considerable evidence of heterogeneity but little evidence of state dependence. (4) Incorrect statistical treatment of heterogeneity and state dependence gives rise to models that forecast rather poorly any past sample participation. (5) The Heckman-Willis model (Journal of Political Economy, February 1977) overstates the estimated extent of heterogeneity.

A DYNAMIC MODEL OF FEMALE LABOR SUPPLY

James J. Heckman, University of Chicago
Tom MaCurdy, Stanford University
(Forthcoming in Review of Economic Studies, 1979.)

This paper develops a life-cycle model of hours of work, wage rates, and labor force participation among married women. The economic model assumes that married women consider the effect of future and past variables on their current labor supply decisions. Relationships among different dimensions of life-cycle labor supply are explored. Under certain conventional assumptions, it is shown that unobserved future variables can be summarized by a "fixed effect" which can be estimated. Thus the economic model implies a certain stochastic specification.

The statistical model is a fixed-effect "Tobit" scheme developed for panel data. This model is new and can be simply estimated. The model is estimated for eight years of data from the Panel Survey of Income Dynamics.

The major empirical findings are as follows: (1) There is little evidence that "transitory" fluctuations in family income and employment affect female labor supply or participation. (2) Once "fixed effects" are estimated, there is little evidence of selection bias in wage rate functions fit on censored samples. (3) There is considerable evidence that "permanent" levels of variables affect labor supply. (4) Future variables, such as expected children and the like, affect current labor supply decisions.

FAMILY STATUS AND LABOR PATTERNS

Martha S. Hill, University of Michigan

In recent years there have been substantial shifts in the family status of young Americans. Major trends include: a decrease in the proportion of youths coming from two-parent families, an increase in the proportion of youths forming one-person or one-parent households, and a shift away from marriage with children toward marriage without children. This paper concentrates on these types of changes in household structure and the associated changes in young people's labor force behavior. The major thrust of the paper is an empirical analysis of data from the 1975 Panel Study of Income Dynamics using multiple classification analysis. Changes over time for the same individuals are also investigated. Results indicate that whether or not the individual is from a stable two-parent family tends to have relatively inconsequential implications for labor supply, except among non-white males. With respect to the individuals' own living arrangements, the results indicate a strong relationship with labor supply. Young men who left home to form married or one-person households increased their labor supply much more than their counterparts who remained in their parents' households, with those forming one-person households working somewhat fewer hours than those forming married households. Young women who left home to form one-person, one-parent, or childless married households increased their labor supply considerably more than their counterparts who either remained in their parents' households or formed married households with children.

WELFARE, REMARRIAGE, AND MARITAL SEARCH

Robert M. Hutchens, Cornell University

This paper considers remarriage from the perspective of economic theories of search and marriage. By combining the two theories, new hypotheses are developed on the relationship between economic variables and marital transitions. The theoretical analysis leads to empirical tests with Panel Study data on the relationship between the level of transfers in the Aid to Families with Dependent Children (AFDC) program and remarriage probabilities. A statistically significant negative relationship is established. Increases in AFDC transfers, then, do contribute to growth in female-headed households. Theoretical considerations suggest, however, that by extending the duration of marital search, such transfers could also contribute to more stable subsequent marriages.

EARNINGS, RISK, AND THE WAGE STRUCTURE OF INDUSTRY

J. Paul Leigh, University of Wisconsin, Doctoral Dissertation

This thesis follows up Adam Smith's suggestion that individuals must be induced to take risky jobs by the offer of compensating wages. For the purposes of this study, it is assumed that individuals will be compensated for taking jobs which offer greater earnings risks. The theory considers the individual's problem in choosing a job for a lifetime. The job-choice model which is developed draws heavily on Markowitz's portfolio choice model. Individuals, endowed with human capital, are assumed to choose among jobs offering different mean and standard deviations of lifetime earnings. More risk averse individuals will choose jobs with low means and standard deviations while less risk averse individuals will choose jobs with high means and standard deviations. The model predicts that an equalizing differences function, or what we call an employment frontier, exists in a labor market for homogeneous workers which summarizes the job opportunities available for these workers.

The statistical task of the thesis is to estimate the employment frontier using data from the Panel Study of Income Dynamics. To operationalize the model it is assumed that lifetime earnings can be approximated by observations on annual earnings over a seven year span and that job choice takes place across industries. A subsample is constructed composed only of those individuals who were continuously employed in but a single industry for seven years. This subsample is used to estimate earnings functions for persons employed in roughly 15 two-digit S.I.C. industries. These earnings functions, in turn, are used to arrive at estimates of the means and standard deviations of long-term earnings for a cohort of individuals employed in different industries. The authors take these estimates as 15 observations along the employment frontier corresponding to this cohort. We then are able to estimate an employment frontier for blue-collar white males which supports the theory that workers trade-off the mean for the standard deviation of long-term earnings in making their job choices.

DYNAMIC ASPECTS OF EARNINGS MOBILITY

Lee A. Lillard
Robert J. Willis
(Published in Econometrica 46, September 1978, pp. 985-1012.)

This paper proposes an econometric methodology to deal with life cycle earnings and mobility among discrete earnings classes. First, the authors use panel data on male log earnings to estimate an earnings function with permanent and serially correlated transitory components due to both measured and unmeasured variables. Assuming that the error components are normally distributed, we develop statements for the probability that an individual's earnings will fall into a particular but arbitrary time sequence of poverty states. Using these statements, the authors illustrate the implications of our earnings model for poverty dynamics and compare our approach to Markov chain models of income mobility.

FAMILY IMPACTS OF THE 1975 RECESSION: UNEMPLOYMENT AMONG FAMILIES WITH CHILDREN

Phyllis Elkins Moen, University of Minnesota
(A dissertation compiled at the University of Minnesota, 1978. Ms. Moen is currently at the College of Human Ecology, Cornell University.)

Using data from the 1975 and 1976 waves of the Panel Study of Income Dynamics this study examines the significance of the 1975 recession for families with children under 18. The following questions are addressed:

1) What families with children were most susceptible to having an unemployed breadwinner during the 1975 recession?
2) Why are some family heads more susceptible to unemployment than others?
3) What families are economically vulnerable in the face of unemployment?
4) What is the relationship between unemployment, economic status and psychological expectations of the family breadwinner?

Regarding the first question it found that nearly 17 percent of this nationwide sample of families with children under 18 had an unemployed breadwinner in 1975. Male heads of families were more susceptible (17 percent) to unemployment than were female heads (13.6 percent). Young families--families with preschoolers--were more likely to have their major breadwinner unemployed as were black families at every life-cycle stage. Multivariate analysis shows, however, that the work experience and race of the head are not significant when life-cycle stage, family headship type, education of head and county unemployment rate are taken into account.

Another phase of the research addresses the vulnerability of families of the unemployed to financial hardship. Twenty-two percent of the sample families with an unemployed breadwinner had inadequate incomes (using an income over needs measure). One-fourth of the families of the unemployed suffered economic deprivation (income loss of 30 percent or more). Log linear analysis documents the importance of various coping strategies--including limiting the duration of unemployment, the presence of additional income receivers, and receiving unemployment compensation--in reducing the vulnerability of families to economic hardship.

THE CONSEQUENCES OF AGE AT FIRST CHILDBIRTH: FINAL RESEARCH SUMMARY

Kristin A. Moore, The Urban Institute

The impact of a woman's age at the birth of her first child on her subsequent social and economic status was assessed using two national, longitudinal data sets. National Longitudinal Survey (NLS) analyses are based on annual interviews conducted between 1968 and 1972 with young women aged 14 to 24 in 1968. Information on women aged 22 to 52 in 1976, both wives and unmarried heads of households, was obtained from the Panel Study of Income Dynamics interviews conducted between 1968 and 1976.

Analyses indicate that an early childbirth reduces the amount of schooling a young woman is able to complete--even net of family background, motivation, and age at marriage--particularly among white and high school age mothers. Teenage mothers also have substantially larger families, net of controls. Early childbirth does not increase marital dissolution, except indirectly by precipitating teenage marriages. Net of other factors, early childbearing has no direct effect on work experience, occupational status, wages, annual earnings, welfare recipiency, or poverty. However, it does have an indirect impact through its effects on education, marriage, and family size.

Results are described in detail for each outcome separately: education; family size; divorce; employment and earnings; welfare; and causal models.

THREE PATHS FROM DISABILITY TO POVERTY

Walter Oi, University of Rochester

The three paths from disability to poverty correspond to three ways in which an individual's stock of health capital might affect his constrained maximum of utility: (1) it can directly reduce utility in a pure consumption model; (2) it can indirectly reduce utility by reducing his market productivity (wage-reducing disabilities); or (3) it can indirectly reduce utility by contracting his potential time endowment (time-stealing disabilities).

The quantitative implications of the theoretical models were explored with the aid of the 1972 data from the Panel Study of Income Dynamics. The author first reviewed the gross differences between healthy and disabled men (in earnings, incomes, hours worked, employment status, etc.) in the light of the three ways in which disability affects labor market activity. Although wage differentials can be observed, time differentials are rarely directly measured. A somewhat indirect method of model calibration was used to infer time endowments. First, results from earlier studies of labor supply were used to get estimates of substitution and income elasticities. Second, the time diary data analyzed by Stafford and Duncan were used to estimate budget shares. The two sets of estimates were combined to construct estimates for the pertinent parameters of labor supply and labor force participation equations. By thus calibrating the model, the author was able to infer the probable decrements in potential time endowments that must have been experienced by moderately and severely disabled men in order to explain the decreases in annual work hours and withdrawals from the labor force. These crude calculations lead the author to the conclusion that disability mainly affects its victims by contracting the potential time endowments available for work and leisure.

EFFECTS OF CHILDREN'S HEALTH ON MATERNAL HOURS OF WORK: A PRELIMINARY ANALYSIS

David Salkever, The Johns Hopkins University

This study analyzed data for 1972 for households with two adults and children under 17 and households with one female adult and children under 17. The standard labor supply model was extended by adding explanatory variables relating to children's disabilities. Estimated Tobit maternal hours-of-work regressions showed stronger negative impacts of disabilities for families with older children and with fewer non-disabled children. While little effect was found on the probability of working, disabilities did reduce hours of work of mothers who were working. A possible explanation of these findings is that children's disabilities increase both the marginal rate of substitution of leisure for income and the monetary and/or non-monetary costs of child care, with the latter increase being disproportionately large for mothers working full time. However, because of the small number of families with disabled children in the Panel Study data, the findings must be viewed as tentative.

INCOME STABILITY IN THE UNITED STATES

Anthony F. Shorrocks, London School of Economics
(Wisconsin Poverty Institute Discussion Paper)

One of the main objectives has been to show that the computation of rigidity values R, a measure of income mobility, and the construction of stability profiles, provide a useful way of summarising data on income dynamics. The rigidity values have an intrinsic interest for those concerned with the extent to which short-run inequality values exaggerate the degree of inequality found over a longer accounting period. Stability profiles form the basis for comparisons across a variety of population subgroups and enable some of the important features of income dynamics to be captured diagramatically.

The choice of inequality index has a considerable impact on the computed values of R, and that use of the Gini coefficient will tend to indicate much higher stability than alternative indices. A significant age effect was found for male earnings stability which together with the characteristic shape of the stability profiles suggests that short-run, transitory income fluctuations dominate income movements at lower ages. Whilst this may come as no surprise, the actual degree of income instability within the younger age groups is perhaps considerably higher than expected; and the fact that transitory fluctuations have an important age component has obvious implications for the modelling of income dynamics which have not always been given sufficient attention.

The stability of female earnings (for those women who are heads of households) seems to be broadly comparable to that of males, although the variation by age group is less pronounced. Total family income also appears to exhibit roughly the same degree of stability as male earnings, despite the fact that the former includes transfer payments and the incomes of other family members which would be thought to have a stabilising influence. The evidence suggests that the explanation of this surprising result is not to be found in variations in the number of persons in the family unit.

Income stability varied substantially across occupations. Furthermore, the ranking of occupations is altered when only those individuals who remain in the same occupational category are considered. Within this population of "stayers," Farmers and the Self Employed experience significantly more income instability than the other occupations. Finally disaggregating by the level of educational attainment showed little difference between the categories. This suggests that the level of education is unlikely to be a major determinant of income stability, apart from its indirect effect via the choice of occupation.

WORK IN PROGRESS

John E. Tropman, University of Michigan
Gregg Dow, University of Michigan

The authors have a variety of results which were obtained through analysis of data from the Panel Study of Income Dynamics. They are currently in the process of putting these results into a readable form. Most likely, there will be two finished products; one will summarize our findings using a tabular format and the other will present results obtained from the estimation of an econometric model.

The authors' aim has been to disaggregate the economic status of "the elderly" as much as possible, and to look in detail at the resources available to specific sociodemographic subgroups within the aged population. The principal variables we used were race, sex, marital status, educational attainment, age, and health status. Within each subgrouping, tables were constructed giving various measures of economic well-being. The latter include labor income, asset income, various forms of transfer income, and welfare ratios based on low-income food budgets.

The results can be summarized quite succinctly: those subgroups within the aged population which are most deprived are identical to the groups in American society as a whole which are most deprived. The authors find that women have fewer economic resources than men, the less well-educated have less than the more educated, blacks do worse than whites, and so on. This much may be obvious, but our tables also document (for a representative sample of almost 1,000 respondents aged 62 or older in 1976) exactly how great the income differences are and in what components of income the gaps are largest. For instance, in the sample blacks have lower income than whites in every category and have drastically lower asset income (private pensions, interest, dividends). A far greater percentage of income for blacks than for whites is obtained from labor, in the supposed "retirement" years. The authors have investigated the extent to which transfers shift the private distribution of income. By and large, the conclusion is "very little." Social Security does virtually nothing to alter the private distribution and, while SSI does tend to redress inequities in income, it is quantitatively insignificant compared with labor, asset, and other transfer income.

The econometric modelling was undertaken in order to estimate the magnitude of these effects and to test for interactions among our various sociodemographic explanatory variables. The authors found the most appropriate model to be a seven-equation system having as dependent variables: (1) average wage of household head; (2) labor supply in hours of household head; (3) average wage of spouse; (4) labor supply of spouse; (5) asset income of household head; (6) combined transfers to family unit. Our explanatory variables were those characteristics listed above and some others--including tax rates, a dummy variable for the effect of the social security earnings test, and a number of interactive terms. Due to elements of simultaneity, the authors estimated the model using two-stage least squares.

The results were generally quite satisfactory. All of the major sociodemographic variables had effects with the expected sign, and the levels of statistical significance achieved were quite high. The authors view these results as solid support for the conclusions reached on the basis of tabular analysis.

The policy implications of the findings can be divided into short-run and long-run recommendations. The short-run conclusion is that it is insufficient to view the aged as a relatively homogeneous group of needy individuals. While no one doubts that the aged are less well off than younger people, all else equal, it is also true that there are very important differences within the aged population in terms of relative need for assistance. If public policy is intended to redress inequality of this sort, these findings have immediate relevance in identifying those whose private resources are inadequate.

Conclusion for the long-run also seem pertinent. The most striking aspect of the results is that poverty in old age is of a piece with poverty in earlier years. Those who are disadvantaged later are so throughout the life-cycle. Low skill levels, racism, and sexism in earlier years have much to do apparently with the abysmally low levels of asset income available to many of the aged. This suggests that policies to help the aged might most appropriately be designed as part of a comprehensive plan to eradicate poverty, not simply as programs for a category of people considered in isolation from the rest of the population. At best, current programs should be seen as remedial, while it may be that preventive measures taken at much earlier stages in the life-cycle would prove far more desirable. Much of the public policy toward the elderly is, perhaps, secretly aimed at rectification, and that may be expecting too much.

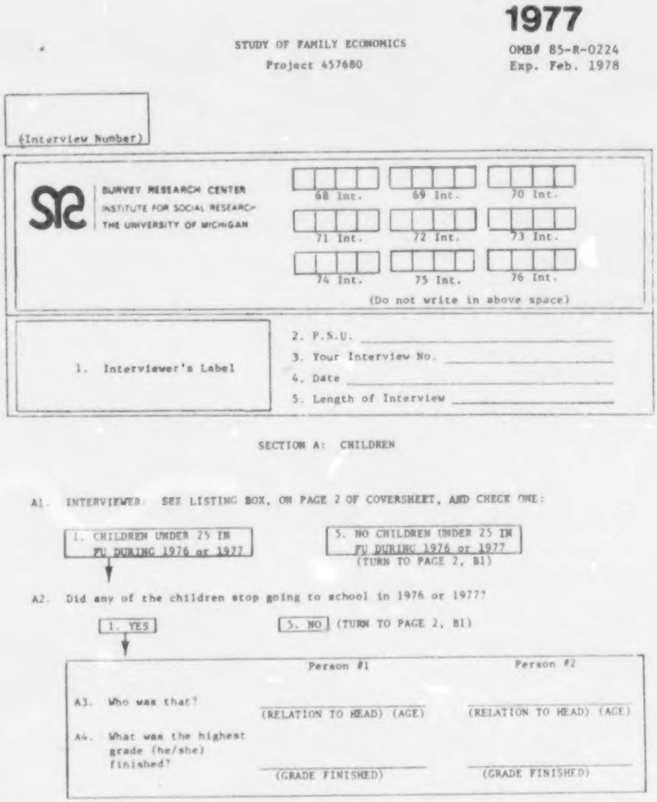
RACE, CLASS, AND INCOME INEQUALITY
Erik Wright, University of Wisconsin, Madison, Wisconsin
(Published in American Journal of Sociology, 83, May 1978, pp. 1368-1396.)

This paper uses Panel Study data to show that ". . . the differences in returns to education between black and white males largely disappear when the regression equations are run within class positions." The author's conclusion is that ". . . much of the commonly observed racial difference in returns to education is a consequence of the distribution of racial groups into class categories." Class is ". . . defined within the Marxist tradition as a common position within the social relations of production."

Appendix A

1977 QUESTIONNAIRE

Although the questionnaire, codes, and study procedures are described each year in a separate documentation volume, we reproduce the 1977 questionnaire in this appendix for readers without access to these volumes.



1977

STUDY OF FAMILY ECONOMICS
Project 457680

OMB# 85-R-0224
Exp. Feb. 1978

(Interview Number)

SURVEY RESEARCH CENTER
INSTITUTE FOR SOCIAL RESEARCH
THE UNIVERSITY OF MICHIGAN

☐☐☐☐ 68 Int.	☐☐☐☐ 69 Int.	☐☐☐☐ 70 Int.
☐☐☐☐ 71 Int.	☐☐☐☐ 72 Int.	☐☐☐☐ 73 Int.
☐☐☐☐ 74 Int.	☐☐☐☐ 75 Int.	☐☐☐☐ 76 Int.

(Do not write in above space)

1. Interviewer's Label

2. P.S.U. ______
3. Your Interview No. ______
4. Date ______
5. Length of Interview ______

SECTION A: CHILDREN

A1. INTERVIEWER: SEE LISTING BOX, ON PAGE 2 OF COVERSHEET, AND CHECK ONE:

☐ 1. CHILDREN UNDER 25 IN FU DURING 1976 or 1977

☐ 5. NO CHILDREN UNDER 25 IN FU DURING 1976 or 1977 (TURN TO PAGE 2, B1)

A2. Did any of the children stop going to school in 1976 or 1977?

☐ 1. YES

☐ 5. NO (TURN TO PAGE 2, B1)

	Person #1	Person #2
A3. Who was that?	______ (RELATION TO HEAD) (AGE)	______ (RELATION TO HEAD) (AGE)
A4. What was the highest grade (he/she) finished?	______ (GRADE FINISHED)	______ (GRADE FINISHED)

SECTION B: TRANSPORTATION

(ASK EVERYONE)

B1. Is there public transportation within walking distance of (here)(your house)?

1. YES   5. NO   (GO TO B3)

B2. Is it good enough so that a person could use it to get to work?

____

____

B3. Do you (or anyone else in the family here) own a car or truck?

1. YES   5. NO   (TURN TO PAGE 3, C1)

B4. How many cars and trucks do you (and your family living here) own? __________

B5. During the last year how many miles did you (and your family) drive in (your car/all of your cars)?

____

____

(TURN TO PAGE 3, C1)

SECTION C: HOUSING

C1. How many rooms do you have for your family (not counting bathrooms)? __________

C2. Do you live in a one-family house, a two-family house, an apartment, a mobile home, or what?

1. ONE-FAMILY   3. APARTMENT   7. OTHER (SPECIFY) ____________________
2. TWO-FAMILY   4. MOBILE HOME   ____________________

C3. Do you own the (home/apartment), pay rent, or what?

1. OWNS OR IS BUYING   5. PAYS RENT (TURN TO PAGE 4, C13)   8. NEITHER OWNS NOR RENTS (TURN TO PAGE 4, C18)

(IF OWNS OR IS BUYING)

C4. About how much did all your utilities like heat and electricity cost you last year?

$____________________ per year

C5. Could you tell me what the present value of your house (farm) is--I mean about what would it bring if you sold it today?

$____________________

C6. Do you have a mortgage on this property?

YES   NO   (GO TO C12)

	1st Mortgage	2nd Mortgage
C7. About how much is the remaining principal on this mortgage?	$________	$________
C8. How much are your monthly mortgage payments?	$________	$________
C9. About how many more years will you have to pay on it?	________	________

C10. Do you also have a 2nd mortgage?

YES   (RETURN TO C7)   NO   (GO TO C11)

C11. Do your mortgage payments include property taxes?

1. YES   5. NO

C12. About how much are your total yearly property taxes including city, county and school taxes?

$____________________

(TURN TO PAGE 5, C22)

(IF PAYS RENT)

C13. About how much rent do you pay a month? $________

C14. Is this (house/apartment) rented furnished?

1. YES 5. NO

C15. Do you pay for any of the utilities like heat and electricity yourself?

1. YES 5. NO (TURN TO PAGE 5, C22)

C16. About how much did they cost you altogether last year?

$________ per year

C17. Is heating included in your monthly rent?

1. YES 5. NO

(TURN TO PAGE 5, C22)

(IF NEITHER OWNS NOR RENTS)

C18. How is that? ________

C19. How much would it rent for if it were rented? $________ per ________ (MONTH,YEAR)

C20. Do you pay for any of the utilities like heat and electricity yourself?

YES NO (TURN TO PAGE 5, C22)

C21. About how much did they cost you altogether last year?

$________ per year

(TURN TO PAGE 5, C22)

(ASK EVERYONE)

C22. Have you (HEAD) moved any time since the spring of 1976?

1. YES 5. NO (GO TO C25)

C23. What month was that? ________ (MOST RECENT MOVE)

C24. Why did you move? ________

C25. Do you think you might move in the next couple of years?

1. YES; MIGHT OR MAYBE 5. NO (TURN TO PAGE 6, D1) 8. DON'T KNOW

C26. Would you say you definitely will move, probably will move, or are you more uncertain?

1. DEFINITELY

2. PROBABLY

3. MORE UNCERTAIN

C27. Why might you move? ________

(TURN TO PAGE 6, D1)

C28. Why might you move?

(TURN TO PAGE 6, D1)

SECTION D: EMPLOYMENT

D1. We would like to know about what you do--are you (HEAD) working now, looking for work, retired, a student, (a housewife,) or what?

1. WORKING NOW
2. ONLY TEMPORARILY LAID OFF
3. LOOKING FOR WORK, UN-EMPLOYED (TURN TO PAGE 12, E1)
4. RETIRED
5. PERMANENTLY DISABLED
6. HOUSEWIFE
7. STUDENT

(TURN TO PAGE 15, F1)

8. OTHER ________ (SPECIFY) → (GO TO D2 IF HAS JOB, OTHERWISE TURN TO PAGE 15, F1)

D2. What is your main occupation? (What sort of work do you do?)

____

____

OCC ☐☐ IND ☐☐

(IF NOT CLEAR) → D3. Tell me a little more about what you do.

____

D4. What kind of business is that in? ____

____

D5. Do you work for someone else, yourself, or what?

1. SOMEONE ELSE
2. BOTH SOMEONE ELSE AND SELF
3. SELF ONLY

1. SOMEONE ELSE

D6. Do you work for the federal, state or local government?

1. YES 5. NO

D7. How often does a supervisor check up on your work? Is it several times a day, once a day, once a week, every few weeks, or less often than that?

1. SEVERAL TIMES/DAY
2. ONCE A DAY
3. ONCE A WEEK
4. EVERY FEW WEEKS
5. LESS OFTEN
6. R DOES NOT HAVE SUPERVISOR

D8. Do you supervise the work of other employees, or tell them what work to do?

1. YES 5. NO (GO TO D11)

D9. About how many people do you supervise?

________ (NUMBER)

D10. Do you have any say about their pay or promotion?

1. YES 5. NO

D11. Is your current job covered by a union contract?

1. YES 5. NO (GO TO D13)

D12. Do you belong to that labor union?

1. YES 5. NO

D13. How long have you worked for your present employer?

________ (MONTHS) ________ (YEARS) ☐☐☐

(TURN TO PAGE 8, D26)

2. BOTH SOMEONE ELSE AND SELF

D14. When you work for others, do you work for the federal, state or local government?

1. YES 5. NO

D15. How often does a supervisor check up on your work? Is it several times a day, once a day, once a week, every few weeks, or less often than that?

1. SEVERAL TIMES/DAY
2. ONCE A DAY
3. ONCE A WEEK
4. EVERY FEW WEEKS
5. LESS OFTEN
6. R DOES NOT HAVE SUPERVISOR

D16. When you work for others, do you supervise the work of other employees, or tell them what work to do?

1. YES 5. NO (GO TO D19)

D17. About how many people do you supervise

________ (NUMBER)

D18. Do you have any say about their pay or promotion?

1. YES 5. NO

D19. Is your current job covered by a union contract?

1. YES 5. NO (GO TO D21)

D20. Do you belong to that labor union?

1. YES 5. NO

D21. How long have you worked for your present employer?

________ (MONTHS) ________ (YEARS) ☐☐☐

D22. When you work for yourself, do you employ other people?

1. YES 5. NO (TURN TO PAGE 8, D26)

D23. How many? ________ (NUMBER) (TURN TO PAGE 8, D26)

3. SELF ONLY

D24. Do you employ other people?

1. YES 5. NO (TURN TO PAGE 8, D26)

D25. How many?

________ (NUMBER)

(TURN TO PAGE 8, D26)

D26. How long have you had your present position? ______ (WEEKS, MONTHS, YEARS) ☐☐☐

IF LESS THAN ONE YEAR   IF ONE YEAR OR MORE → (GO TO D32)

D27. What month did you start this job? ______

D28. What happened to the job you had before--did the company go out of business, were you laid off, promoted, were you not working, or what?

______

______ ☐ 5. NO PREVIOUS JOB (GO TO D32)

D29. On the whole, would you say your present job is better or worse than the one you had before?

☐ 1. BETTER ☐ 5. WORSE ☐ 3. SAME → (GO TO D31)

D30. Why is it (better/worse)? ______

______

______

D31. Does your present job pay more than the one you had before?

☐ 1. YES, MORE ☐ 5. NO, SAME OR LESS (GO TO D32)

D32. Did you miss any work in 1976 because someone else in the family was sick?

☐ 1. YES ☐ 5. NO (GO TO D35)

D33. Was that your wife, a child, or who?

☐ 1. WIFE/FRIEND ☐ 2. CHILD OR CHILDREN ☐ 7. OTHER

D34. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

D35. Did you miss any work in 1976 because you were sick?

☐ 1. YES ☐ 5. NO (GO TO D37)

D36. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

D37. How many weeks of paid vacation do you get each year? ______ (WEEKS)

D38. Did you take any vacation or time off during 1976?

☐ 1. YES ☐ 5. NO (TURN TO PAGE 9, D40)

D39. How much vacation or time off did you take? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

D40. Did you miss any work in 1976 because you were on strike?

☐ 1. YES ☐ 5. NO (GO TO D42)

D41. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

D42. Did you miss any work in 1976 because you were unemployed or temporarily laid off?

☐ 1. YES ☐ 5. NO (GO TO D46)

D43. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

D44. Were those periods of unemployment or layoff all in one stretch, in two periods, or more than two?

☐ 1. ALL IN ONE STRETCH ☐ 3. TWO PERIODS (GO TO D46) ☐ 5. MORE THAN TWO

D45. How many periods was that?

______

D46 Then, how many weeks did you actually work on your main job in 1976? ______ (WEEKS)

D47. And, on the average, how many hours a week did you work on your main job in 1976?

______ (HOURS/WEEK)

D48. Did you work any overtime which isn't included in that?

☐ 1. YES ☐ 5. NO (TURN TO PAGE 10, D50)

D49. How many hours did that overtime amount to in 1976? ______ (HOURS)

D50. Are you salaried, paid by the hour, or what?

1. SALARIED

D51. How much is your salary?
$__________ per __________

D52. If you were to work more hours than usual during some week, would you get paid for those extra hours of work?

1. YES
5. NO (GO TO D58)

D53. About how much would you make per hour for that overtime?
$______________
(PER HOUR)

(GO TO D58)

3. PAID BY HOUR

D54. What is your hourly wage rate for your regular work time?
$______________
(PER HOUR)

D55. What is your hourly wage rate for overtime?
$______________
(PER HOUR)

(GO TO D58)

7. OTHER

D56. How is that?
____
____
____
____

D57. If you worked an extra hour, how much would you earn for that hour?
$______________

(GO TO D58)

D58. Did you have any extra jobs or other ways of making money in addition to your main job in 1976?

1. YES
5. NO (TURN TO PAGE 11, D64)

OCC ☐☐

D59. What did you do? ____
____

D60. Anything else? ____
____

D61. About how much did you make per hour at this? $__________ (PER HOUR)

D62. And how many weeks did you work on your extra job(s) in 1976? __________ (WEEKS)

D63. On the average, how many hours a week did you work on your extra job(s)?
____ (HOURS PER WEEK)

D64. Was there more work available (on your job/any of your jobs) so that you could have worked more if you had wanted to?

1. YES

D65. How much would you have earned per hour?
$____________ (PER HOUR) →

5. NO OR DON'T KNOW

D66. Would you have liked to work more if you could have found more work?

1. YES (GO TO D69)
5. NO

D67. Could you have worked less if you had wanted to?

1. YES (GO TO D69)
5. NO

D68. Would you have preferred to work less even if you had earned less money?

1. YES
5. NO
(GO TO D69)

D69. About how much time does it take you to get to work each day, door to door?

______________________ (ONE WAY)

00. NONE (TURN TO PAGE 17, G1)

D70. About how many miles is it to where you work? ____________ (ONE WAY)

D71. Do you use public transportation to get to work, have a car pool, drive by yourself, walk, drive with your wife, or what?

1. PUBLIC TRANSPORTATION	2. CAR POOL	3. DRIVE	4. DRIVE WITH WIFE	5. WALK	7. OTHER (SPECIFY): ______________

(TURN TO PAGE 17, G1)

SECTION E: IF LOOKING FOR WORK, UNEMPLOYED IN D1

OCC ☐☐

E1. What kind of job are you looking for? ______________________

____

E2. How much would you expect to earn? $__________ PER __________

E3. Will you have to get any training to qualify? __________

E4. Have you been doing anything in the last four weeks to find a job?

1. YES　　5. NO (GO TO E6)

E5. How many places have you been to in the last four weeks to find out about a job?

0. NONE　　1. ONE　　2. TWO　　3. THREE　　4. FOUR　　5. FIVE OR MORE

E6. Are there some jobs around here you wouldn't take because of where these jobs are located?

1. YES　　5. NO　　8. DON'T KNOW

E7. Are there some jobs around here you wouldn't take because of the hours they want you to work?

1. YES　　5. NO　　8. DON'T KNOW

E8. Are there jobs available around here that just aren't worth taking?

1. YES　　5. NO (GO TO E10)

E9. How much do they pay? $__________ PER __________

E10. Would you be willing to move to another community if you could get a good job there?

1. YES, MAYBE, OR DEPENDS　　5. NO

E11. How much would a job have to pay for you to be willing to move?

$________ PER __________

(TURN TO PAGE 13, E13)

E12. Why is that? __________

____

____

(TURN TO PAGE 13, E13)

E13. How long have you been looking for work? __________

E14. Have you ever had a job?

1. YES　　5. NO (TURN TO PAGE 17, G1)

E15. What sort of work did you do on your last job? (What was your occupation?)

__________　　OCC ☐☐　　IND ☐☐

E16. What kind of business was that in?

____

E17. Did you supervise the work of other employees or tell them what to do?

1. YES　　5. NO

E18. What happened to that job--did the company go out of business, were you laid off, or what?

____

E19. When did you last work? __________

IF 1976 OR 1977　　IF BEFORE 1976 (TURN TO PAGE 17, G1)

E20. Did you take any vacation or time off during 1976?

1. YES　　5. NO (GO TO E22)

E21. How much vacation or time off did you take? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

E22. Did you miss any work in 1976 because someone else in the family was sick?

1. YES　　5. NO (GO TO E25)

E23. Was that your wife, a child, or who?

1. WIFE/FRIEND　　2. CHILD OR CHILDREN　　7. OTHER

E24. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

E25. Did you miss any work in 1976 because you were sick?

1. YES　　5. NO (TURN TO PAGE 14, E27)

E26. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

E27. Did you miss any work in 1976 because you were on strike?

1. YES   5. NO (GO TO E29)

E28. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

E29. Did you miss any work in 1976 because you were unemployed or temporarily laid off?

1. YES   5. NO (GO TO E33)

E30. How much work did you miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

E31. Were those periods of unemployment all in one stretch, in two periods, or more than two?

1. ALL IN ONE STRETCH   3. TWO PERIODS   5. MORE THAN TWO

(GO TO E33)

E32. How many periods was that? ______

E33. Then, how many weeks did you actually work on your job in 1976?

______ (WEEKS)

E34. And, on average, how many hours a week did you work when you worked?

______ (HOURS PER WEEK)

E35. On your last job, how much time did it take you to get to work each day, door to door?

______ (ONE WAY)   00. NONE (TURN TO PAGE 17, G1)

E36. About how many miles was it to where you worked? ______ (ONE WAY)

E37. Did you use public transportation to get to work, have a car pool, drive by yourself, walk, drive with your wife, or what?

1. PUBLIC TRANSPORTATION   2. CAR POOL   3. DRIVE   4. DRIVE WITH WIFE   5. WALK   7. OTHER (SPECIFY) ______

(TURN TO PAGE 17, G1)

SECTION F: RETIRED, HOUSEWIFE, STUDENT, PERMANENTLY DISABLED

F1. INTERVIEWER: REFER TO D1 AND CHECK ONE:

1. RETIRED   5. PERMANENTLY DISABLED, HOUSEWIFE, STUDENT OR OTHER **(GO TO F3)**

F2. When you retired, was it because of your health?

1. YES   5. NO

F3. During the last year (1976), did you do any work for money?

1. YES   5. NO

F4. Are you thinking about getting a job in the future?

1. YES   5. NO (TURN TO PAGE 16, F14)

F5. When might that be? (How soon?) ______ (TURN TO PAGE 16, F14)

OCC ☐☐   IND ☐☐

F6. What kind of work did you do when you worked? (What was your occupation?)

______

F7. What kind of business was that in? ______

F8. How many weeks did you work last year? ______ (WEEKS)

F9. About how many hours a week did you work (when you worked)? ______ (HOURS PER WEEK)

F10. Are you still working?

1. YES (GO TO F12)   5. NO

F11. What happened to that job--did the company go out of business, were you laid off, or what?

______

______

F12. Are you thinking of getting a job in the future?

1. YES   5. NO (TURN TO PAGE 16, F14)

F13. When might that be? (How soon?) ______

(TURN TO PAGE 16, F14)

F14. INTERVIEWER: REFER TO F4 and F12 AND CHECK ONE:

1. "YES" TO THINKING ABOUT GETTING A JOB

5. "NO" TO THINKING ABOUT GETTING A JOB (TURN TO PAGE 17, G1)

F15. What kind of job do you have in mind? ____________________

F16. How much would you expect to earn? $__________ PER __________

F17. Would you have to get any training to qualify?

1. YES   5. NO (GO TO F20)

F18. How could you get that training? ____________________

F19. Are you getting any such training now?

1. YES   5. NO

F20. Have you been doing anything in the last four weeks to find a job?

1. YES   5. NO (GO TO F22)

F21. How many places have you been to in the last four weeks to find out about a job?

0. NONE   1. ONE   2. TWO   3. THREE   4. FOUR   5. FIVE OR MORE

F22. Are there some jobs around here you wouldn't take because of where these jobs are located?

1. YES   5. NO   8. DON'T KNOW

F23. Are there some jobs around here you wouldn't take because of the hours they want you to work?

1. YES   5. NO   8. DON'T KNOW

F24. Are there jobs around here that just aren't worth taking?

1. YES   5. NO (TURN TO PAGE 17, G1)

F25. How much do they pay? $__________ PER __________

SECTION G: WIFE'S WORK, HOUSEWORK AND FOOD

(ASK EVERYONE)

G1. Are you married, widowed, divorced, separated, or single?

1. MARRIED (GO TO G4)   2. SINGLE   3. WIDOWED   4. DIVORCED   5. SEPARATED (GO TO G4)

G2. Were you ever married?

1. YES   5. NO (GO TO G4)

G3. What happened to your last marriage -- were you widowed, divorced, separated, or what?

3. WIDOWED   4. DIVORCED   5. SEPARATED   7. OTHER (SPECIFY) __________

G4. INTERVIEWER: REFER TO COVER SHEET AND CHECK ONE:

1. MALE HEAD IS MARRIED OR MALE HEAD HAS BEEN LIVING WITH FEMALE FRIEND FOR ONE YEAR OR MORE

5. ALL OTHERS (TURN TO PAGE 20, G33)

G5. Did your (wife/friend) do any work for money in 1976?

1. YES   5. NO (TURN TO PAGE 19, G23)

OCC ☐☐   IND ☐☐

G6. What kind of work did she do? ____________________

G7. What kind of business is that in? ____________________

G8. Did your (wife/friend) miss any work in 1976 because someone else in the family was sick?

☐ 1. YES ☐ 5. NO (GO TO G11)

G9. Was that you, a child, or who?

☐ 1. HEAD ☐ 2. CHILD OR CHILDREN ☐ 7. OTHER

G10. How much work did she miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

G11. Did your (wife/friend) miss any work in 1976 because she was sick?

☐ 1. YES ☐ 5. NO (GO TO G13)

G12. How much work did she miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

G13. Did your (wife/friend) take any vacation or time off during 1976?

☐ 1. YES ☐ 5. NO (GO TO G15)

G14. How much vacation or time off did she take? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

G15. Did your (wife/friend) miss any work in 1976 because she was on strike?

☐ 1. YES ☐ 5. NO (GO TO G17)

G16. How much work did she miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

G17. Did your (wife/friend) miss any work in 1976 because she was unemployed or temporarily laid off?

☐ 1. YES ☐ 5. NO (TURN TO PAGE 19, G21)

G18. How much work did she miss? ______ (DAYS) ______ (WEEKS) ______ (MONTHS)

G19. Were those periods of unemployment or layoff all in one stretch, in two periods, or more than two?

☐ 1. ALL IN ONE STRETCH ☐ 3. TWO PERIODS ☐ 5. MORE THAN TWO

(TURN TO PAGE 19, G21)

G20. How many periods was that?

______ (TURN TO PAGE 19, G21)

G21. Then, how many weeks did she actually work on her main job in 1976? ______ (WEEKS)

G22. And, on the average, how many hours a week did she work on her main job in 1976?

______ (HOURS/WEEK)

G23. INTERVIEWER: REFER TO FAMILY LISTING, PAGE 2 OF COVER SHEET, AND CHECK ONE:

☐ 1. CHILD/CHILDREN UNDER 12 IN FAMILY NOW ☐ 5. NO CHILDREN UNDER 12 IN FAMILY NOW (TURN TO PAGE 20, G31)

G24. Is your (wife/friend) working for money now?

☐ 1. YES ☐ 5. NO (TURN TO PAGE 20, G31)

G25. How (are the children/is the child) taken care of while she works?

______

______

☐ 7. PUBLIC SCHOOL ONLY (GO TO G29)

G26. How many hours per week (are they/is he/is she) taken care of? ______ (HOURS PER WEEK)

G27. Do you pay money for this?

☐ 1. YES ☐ 5. NO (GO TO G29)

G28. How much does that cost you per week?

$______ PER WEEK

G29. In the past year how many times did someone have to stay home from work to take care of the (children/child) because these arrangements broke down?

☐ 1. FAIRLY OFTEN; 2 OR MORE TIMES PER MONTH ☐ 2. ONCE A MONTH ☐ 3. ONCE IN A WHILE; 3-11 TIMES PER YEAR ☐ 4. RARELY; ONCE OR TWICE A YEAR ☐ 5. NEVER ☐ 9. DON'T KNOW

(5, 9: TURN TO PAGE 20, G31)

G30. Who was that? Was it you, your (wife/friend), or someone else?

______

(TURN TO PAGE 20, G31)

G31. How do you feel about (your (wife/friend) working) (the possibility of your (wife/friend) working)? Are you very much in favor of it, somewhat in favor of it, neither in favor of nor against it, somewhat against it, or very much against it?

☐ 1. VERY MUCH IN FAVOR
☐ 2. SOMEWHAT IN FAVOR
☐ 3. NEITHER IN FAVOR NOR AGAINST
☐ 4. SOMEWHAT AGAINST
☐ 5. VERY MUCH AGAINST
☐ 8. DON'T KNOW

G32. About how much time does your (wife/friend) spend on housework in an average week--I mean time spent cooking, cleaning, and doing other work around the house?

____________________ HOURS PER WEEK

(ASK EVERYONE)

G33. About how much time do you (HEAD) spend on housework in an average week? (I mean time spent cooking, cleaning, and doing other work around the house?)

____________________ HOURS PER WEEK

G34. INTERVIEWER: CHECK ONE

☐ FU INCLUDES PEOPLE OTHER THAN HEAD AND WIFE
☐ 0. ONLY HEAD OR HEAD AND WIFE IN FU (TURN TO PAGE 21, G39)

G35. Does anyone else here in the household help with the housework?

☐ 1. YES
☐ 5. NO (TURN TO PAGE 21, G39)

	Person #1		Person #2		Person #3	
G36. Who is that?	________ (RELATIONSHIP TO HEAD)	____ (AGE)	________ (RELATIONSHIP TO HEAD)	____ (AGE)	________ (RELATIONSHIP TO HEAD)	____ (AGE)
G37. About how much time does (he/she) spend on housework in an average week?	________		________		________	

G38. Anyone else? [ ] YES → (ASK G36-37 ABOVE) [ ] NO → (TURN TO PAGE 21, G39)

G39. Did you (or anyone else now living in your family) receive or buy government food stamps last month?

☐ YES
☐ NO

G40. For how many members of your family were stamps issued?

____

G41. How much did you pay for the stamps?

$__________ per __________ (WEEK, MONTH)

G42. How much food could you buy with the stamps?

$__________ per __________ (WEEK, MONTH)

G43. In addition to what you spent on food stamps, did you (FAMILY) spend any money on food that you use at home?

☐ YES
☐ NO (GO TO G45)

G44. How much?

$__________ per __________ (WEEK, MONTH)

G45. Do you have any food delivered to the door which isn't included in that?

☐ YES
☐ NO (GO TO G47)

G46. How much do you spend on that food?

$__________ per __________ (WEEK, MONTH)

G47. About how much do you (FAMILY) spend eating out, not counting meals at work or at school?

$__________ per __________ (WEEK, MONTH)

(TURN TO PAGE 22, G52)

G48. How much do you (FAMILY) spend on food that you use at home in an average week?

$__________ per __________ (WEEK, MONTH)

G49. Do you have any food delivered to the door which isn't included in that?

☐ YES
☐ NO (GO TO G51)

G50. How much do you spend on that food?

$__________ per __________ (WEEK, MONTH)

G51. About how much do you (FAMILY) spend eating out, not counting meals at work or at school?

$__________ per __________ (WEEK, MONTH)

(TURN TO PAGE 22, G52)

G52. Did you (FAMILY) use government food stamps (commodity stamps) at any time in 1976?

1. YES → G53

G53. How much did you pay for the stamps in 1976?

$__________ per __________ (WEEK, MONTH)

G54. How much food could you buy with the stamps in 1976?

$__________ per __________ (WEEK, MONTH)

G55. For how many months did you use food stamps in 1976?

__________ MONTHS

(TURN TO PAGE 23, H1)

5. NO → G56

G56. Many families who are eligible for food stamps do not get them, and we are interested in finding out why. Do you think you were eligible for food stamps at any time in 1976?

1. YES | 3. MAYBE | 8. DK → G57 | 5. NO (TURN TO PAGE 23 H1)

G57. Why didn't you (get/try to get) food stamps?

____

____

____

____

G58. Can you tell me a little more about that?

____

____

____

____

(TURN TO PAGE 23, H1)

(ASK EVERYONE)

H1. To get an accurate financial picture of people all over the country, we need to know the income of all the families that we interview.

(INTERVIEWER: CHECK ONE)

1. FARMER, OR RANCHER → H2

5. NOT A FARMER OR RANCHER → (GO TO H5)

H2. What were your total receipts from farming in 1976, including soil bank payments and commodity credit loans? $__________ A

H3. What were your total operating expenses, not counting living expenses? $__________ B

H4. That left you a net income from farming of? A-B = $__________ A-B

H5. Did you (R AND FAMILY) own a business at any time in 1976, or have a financial interest in any business enterprise?

1. YES → H6

5. NO → (GO TO H8)

H6. Was it a corporation or an unincorporated business, or did you have an interest in both kinds?

1. CORPORATION → (GO TO H8)

2. UNINCORPORATED → H7

3. BOTH → H7

8. DON'T KNOW → H7

H7. How much was your (FAMILY'S) share of the total income from the business in 1976 -- that is, the amount you took out plus any profit left in?

$__________

(ASK EVERYONE)

H8. How much did you (HEAD) receive from wages and salaries in 1976, that is, before anything was deducted for taxes or other things? $__________

H9. In addition to this, did you have any income from bonuses, overtime or commissions?

☐ YES ☐ NO (GO TO H11)

H10. How much was that? $________

H11. Did you (HEAD) receive any other income in 1976 from:

(IF "YES" TO ANY ITEM, ASK "How much was it?" ENTER AMOUNT AT RIGHT)

(IF "NO" ENTER "0")

a) professional practice or trade?	$________	per ________
b) farming or market gardening, roomers or boarders?	$________	per ________
c) dividends, interest, rent, trust funds, or royalties?	$________	per ________
d) ADC, AFDC?	$________	per ________
e) other welfare?	$________	per ________
f) Social Security?	$________	per ________
g) other retirement pay, pensions, or annuities?	$________	per ________
h) unemployment compensation	$________	per ________
i) workmen's compensation	$________	per ________
j) alimony	$________	per ________
k) child support?	$________	per ________
m) help from relatives?	$________	per ________
n) Supplemental Security Income, the gold (tan, yellow) checks?	$________	per ________
p) anything else? ________ (SPECIFY)	$________	per ________

H12. Did anyone (else) not living here now help you (FAMILY) out financially -- I mean give you money, or help with your expenses during 1976?

☐ YES ☐ NO (TURN TO PAGE 25, H14)

H13. How much did that amount to last year? $________

(DO NOT WRITE IN THIS SPACE) HEAD TYPE INCOME:	
TAXABLE	TRANSFER
L A	☐☐

H14. INTERVIEWER: REFER TO H11d, H11e, and H11n AND CHECK ONE:

☐ 1. INCOME FROM WELFARE, ADC, AFDC OR SUPPLEMENTAL SECURITY

☐ 5. NO SUCH INCOME (GO TO H18)

H15. Did welfare also help with your rent or other bills?

☐ 1. YES ☐ 5. NO (GO TO H17)

H16. What did they pay for? ________

____

H17. There is a public program called Medicaid (Medi-Cal, Medical Assistance, Welfare, Medical Services) which provides medical assistance to persons in need. During the past year, has anyone in the family received medical care which has been or will be paid for by Medicaid (Medi-Cal, Medical Assistance, Welfare, Medical Services)?

☐ 1. YES ☐ 5. NO

H18. INTERVIEWER: DOES HEAD HAVE WIFE OR FEMALE FRIEND IN FU?

☐ YES, WIFE/FRIEND IN FU

☐ NO WIFE/FRIEND IN FU OR FU HAS FEMALE HEAD (GO TO H24)

H19. Did your (wife/friend) have any income during 1976?

☐ YES ☐ NO (GO TO H24)

H20. Was it income from wages, salary, a business, or what?

________ (SOURCE) ________ (SOURCE)

H21. How much was it before deductions?

$________ $________

H22. Did your (wife/friend) receive any unemployment compensation in 1976?

☐ 1. YES ☐ 5. NO (GO TO H24)

H23. How much was that? $________

H24. INTERVIEWER: REFER TO H11f and H20 AND CHECK ONE:

☐ 1. HEAD/WIFE HAS INCOME FROM SOCIAL SECURITY

☐ 5. NO SUCH INCOME (TURN TO PAGE 26, H26)

H25. Do you (or your wife/friend) have Medicare from Social Security?

☐ 1. YES ☐ 5. NO

(TURN TO PAGE 26, H26)

(DO NOT WRITE IN THIS SPACE) WIFE TYPE INCOME:	
TAXABLE	TRANSFER
L A	☐☐

H26. INTERVIEWER: REFER BACK TO COVER SHEET AND LIST HERE ALL PERSONS OVER 13 OTHER THAN THE CURRENT HEAD AND WIFE. LIST THOSE IN THE FU AT ANY TIME DURING 1976, INCLUDING THOSE WHO MOVED OUT.

☐ NONE → (TURN TO PAGE 28, H39)

	(RELATION TO HEAD) (AGE)	(RELATION TO HEAD) (AGE)	(RELATION TO HEAD) (AGE)	(RELATION TO HEAD) (AGE)
H27. Did (MENTION PERSON) have any income in 1976?	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)
H28. About how much did that amount to in 1976?	$________ in 1976	$________ in 1976	$________ in 1976	$________ in 1976
H29. Was that from wages, a pension, a business or what?	(SOURCE) TX ☐☐☐☐☐ ☐	(SOURCE) TX ☐☐☐☐☐ ☐	(SOURCE) TX ☐☐☐☐☐ ☐	(SOURCE) TX ☐☐☐☐☐ ☐
IF WAGES OR BUSINESS				
H30. What kind of work did (he/she) do?	(OCCUPATION)	(OCCUPATION)	(OCCUPATION)	(OCCUPATION)
H31. Can you tell me about how many weeks (he/she) worked?	(WEEKS)	(WEEKS)	(WEEKS)	(WEEKS)
H32. About how many hours a week was that?	(HOURS)	(HOURS)	(HOURS)	(HOURS)
H33. (IF DON'T KNOW) Was it more than half time?				
H34. Did (he/she) miss any work in 1976 because of unemployment or a strike? ☐ YES ☐ NO (GO TO H36)	☐☐☐☐ ☐	☐☐☐☐ ☐	☐☐☐☐ ☐	☐☐☐☐ ☐
H35. How much work did (he/she) miss?	(DAYS) (WEEKS) (MONTHS) ☐☐☐☐ ☐	(DAYS) (WEEKS) (MONTHS) ☐☐☐☐ ☐	(DAYS) (WEEKS) (MONTHS) ☐☐☐☐ ☐	(DAYS) (WEEKS) (MONTHS) ☐☐☐☐ ☐
H36. Did (he/she) have any other income?	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)	☐ YES ☐ NO (GO TO H27 FOR NEXT PERSON LISTED)
H37. What was that from?	(SOURCE)	(SOURCE)	(SOURCE)	(SOURCE)
H38. How much was that last year?	$________ in 1976 TR ☐☐☐☐☐ ☐	$________ in 1976 TR ☐☐☐☐☐ ☐	$________ in 1976 TR ☐☐☐☐☐ ☐	$________ in 1976 TR ☐☐☐☐☐ ☐

(DO NOT WRITE IN THIS SPACE)

TAXABLE	TRANSFER	TAXABLE	TRANSFER	TAXABLE	TRANSFER	TAXABLE	TRANSFER
L A	☐☐	L A	☐☐	L A	☐☐	L A	☐☐

(TURN TO PAGE 28, H39)

(ASK EVERYONE)

H39. Did anyone *else* living here in 1976 have any income? (INCLUDING CHILDREN UNDER 14)

YES   NO (GO TO H41)

H40. Who was that?

______ (RELATION TO HEAD) ______ (AGE)   ______ (RELATION TO HEAD) ______ (AGE)   ______ (RELATION TO HEAD) ______ (AGE)

(TURN *BACK* AND ASK H27-H38 FOR THESE ADDITIONAL MEMBERS)

H41. INTERVIEWER: REFER TO H27-H38 AND CHECK ONE:

1. OTHER FAMILY MEMBERS WITH ADC, AFDC, SUPPLEMENTAL SECURITY, OR OTHER WELFARE   5. NO SUCH PERSONS (GO TO H43)

H42. There is a public program called Medicaid (Medi-Cal, Medical Assistance, Welfare, Medical Services) which provides medical assistance to persons in need. During the past year, has anyone (else) in the family received medical care which has been or will be paid for by Medicaid (Medi-Cal, Medical Assistance, Welfare, Medical Services)?

1. YES   5. NO

H43. INTERVIEWER: REFER TO H27-H38 AND CHECK ONE:

1. OTHER FAMILY MEMBERS WITH SOCIAL SECURITY   5. NO SUCH PERSONS (GO TO H45)

H44. Does anyone (else) in the family have Medicare from Social Security?

1. YES   5. NO

H45. Did you get any other money in 1976 -- like a big settlement from an insuranc company, or an inheritance?

1. YES   5. NO (TURN TO PAGE 29, H47)

H46. How much did that amount to? $__________________ in 1976

H47. Do you help support anyone who doesn't live here with you?

1. YES   5. NO (GO TO H52)

H48. How many? __________

H49. How much money did that amount to in the last year? $__________ in 1976

H50. Were any of these people dependent on you for more than half of their total support?

1. YES   5. NO (GO TO H52)

H51. How many? ______________

H52. Do you belong to a labor union?

1. YES   5. NO

H53. Do you have any physical or nervous condition that limits the type of work or the amount of work you can do?

1. YES   5. NO (GO TO H55)

H54. Does it limit your work a lot, somewhat, or just a little?

1. A LOT   3. SOMEWHAT   5. JUST A LITTLE

H55. INTERVIEWER: REFER TO PAGE 2 OF COVER SHEET AND CHECK ONE:

1. FU INCLUDES PEOPLE OTHER THAN HEAD   5. HEAD IS ONLY PERSON IN FU (TURN TO PAGE 30, J1)

H56. Is there anyone (else) in this family who requires a lot of extra care because of (his/her) condition?

1. YES   5. NO (TURN TO PAGE 30, J1)

H57. Who is that? ______________ (RELATION TO HEAD) ______ (AGE)

(TURN TO PAGE 30, J1)

INTERVIEWER: REMEMBER TO FILL OUT "BY OBSERVATION" SECTION ON ALL INTERVIEWS

SECTION J: NEW WIFE

J1. INTERVIEWER: REFER TO COVER SHEET, AND CHECK ONE:

☐ 1. FU HAS NEW (WIFE/PERMANENT FRIEND) THIS YEAR

☐ 5. FU HAS SAME (WIFE/PERMANENT FRIEND) AS IN 1976 OR FU HAS NO (WIFE/PERMANENT FRIEND) OR FU HAS FEMALE HEAD (TURN TO PAGE 31, K1)

J2. How many grades of school did your (wife/friend) finish?

GRADES OF SCHOOL: ☐ 00 ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12

COLLEGE: ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17+

J3. Did she have any other schooling?

☐ 1. YES ☐ 5. NO (GO TO J8)

J4. What other schooling did she have?

____

____

____

(GO TO J8)

J5. What college was that?

____

J6. Does she have a college degree?

☐ 1. YES ☐ 5. NO (GO TO J8)

J7. Does she have any advanced degrees?

☐ 1. YES ☐ 5. NO

(GO TO J8)

J8. How much education did your (wife's/friend's) father have? ____________

J9. How much education did your (wife's/friend's) mother have? ____________

J10. How many years altogether has she worked for money since she was 18?

__________(YEARS) ☐ 00. NONE (TURN TO PAGE 31, K1)

J11. How many of these years did she work full time for most or all of the year?

__________(YEARS) ☐ ALL (TURN TO PAGE 31, K1)

J12. During the years that she was not working full time, how much of the time did she work?

____________________ ☐☐ ☐

(TURN TO PAGE 31, K1)

SECTION K: NEW HEAD

K1. INTERVIEWER: CHECK ONE

☐ 1. FU HAS A NEW HEAD THIS YEAR

☐ 5. THIS FU HAS THE SAME HEAD AS IN 1976 (TURN TO PAGE 3 OF COVER SHEET)

K2. Now I have some questions about your family and past experiences. Where did your father and mother grow up? (FROM BIRTH TO 18 YEARS OF AGE)

ST, CO- FA ☐☐☐☐☐ Father: ____________ (State if U.S., Country if foreign) ________ (COUNTY OR TOWN)

ST, CO- MO ☐☐☐☐☐ Mother: ____________ (State if U.S., Country if foreign) ________ (COUNTY OR TOWN)

K3. What was your father's usual occupation when you were growing up? OCC ☐

____

____

K4. Thinking of your (HEAD'S) first full time regular job, what did you do? OCC ☐

____________________ ☐ 0. NEVER WORKED (GO TO K6)

K5. Have you had a number of different kinds of jobs, or have you mostly worked in the same occupation you started in, or what?

____

____

K6. Do you (HEAD) have any children who don't live with you?

☐ YES ☐ NO (GO TO K9)

1st ☐☐

2nd ☐☐

3rd ☐☐

K7. How many? ________(NUMBER)

K8. When were they born? ________ (YEAR BORN) ________ (YEAR BORN) ________ (YEAR BORN) # ☐☐

# BY 25 ☐

K9. Did you (HEAD) have any children who are not now living?

☐ YES ☐ NO (TURN TO PAGE 32, K11)

K10. When were they born? ________ (YEAR BORN) ________ (YEAR BORN) ________ (YEAR BORN)

K11. How many brothers and sisters did you (HEAD) have? ______________ (SPECIFY NUMBER) ☐ 0. NONE (GO TO K13)

K12. Were any of your brothers or sisters older than you?

☐ 1. YES ☐ 5. NO

K13. Did you (HEAD) grow up on a farm, in a small town, in a large city, or what?

☐ 1. FARM ☐ 2. SMALL TOWN ☐ 3. LARGE CITY OTHER ______________ (SPECIFY)

K14. In what state and county was that? (EXAMPLE: ILLINOIS, COOK COUNTY)

ST, CO- H ☐☐☐☐☐ ______________ (STATE) ______________ (COUNTY)

(IF DON'T KNOW TO K14) → K15. What was the name of the nearest town?

______________ (TOWN)

K16. What other states or countries have you lived in? (Including time spent abroad while in the armed forces.)

____

K17. Have you (HEAD) ever moved out of a community where you were living in order to take a job somewhere else?

☐ 1. YES (→ K19) ☐ 5. NO (→ K18)

K18. Have you ever turned down a job because you did not want to move?

☐ 1. YES ☐ 5. NO

K19. Were your parents poor when you were growing up, pretty well off, or what?

____

K20. How much education did your (HEAD'S) father have? ______________

(IF LESS THAN 6 GRADES) → K21. Could he read and write? ______________

K22. How much education did your (HEAD'S) mother have? ______________

(IF LESS THAN 6 GRADES) → K23. Could she read and write? ______________

K24. Are you (HEAD) a veteran?

☐ 1. YES ☐ 5. NO

K25. How many years have you (HEAD) worked since you were 18?

______________ (YEARS) ☐ 00. NONE (GO TO K28)

K26. How many of these years did you work full time for most of the year?

______________ (NUMBER OF YEARS) ☐ ALL (GO TO K28)

K27. During the years that you were not working full time, how much of the time did you work?

____

____ ☐☐ ☐

____

K28. How many grades of school did you (HEAD) finish?

GRADES OF SCHOOL		COLLEGE
☐ 00 ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06	☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12	☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17+
K29. Did you get any other training? ☐ 1. YES (→ K30) ☐ 5. NO (GO TO K31) K30. What was it? ______________ ______________ ______________ K31. Do you have any trouble reading? ______________ (GO TO K37)	K32. Did you have any other schooling? ☐ 1. YES (→ K33) ☐ 5. NO (GO TO K37) K33. What other schooling did you have? ______________ ______________ ______________ (GO TO K37)	K34. What college was that? ______________ K35. Do you have a college degree? ☐ 1. YES (→ K36) ☐ 5. NO (GO TO K37) K36. Do you have any advanced degrees? ☐ 1. YES ☐ 5. NO (GO TO K37)

K37. May we record your religious preference?

☐ 1. YES (→ K38) ☐ 5. NO (TURN TO PAGE 3 OF COVER SHEET)

K38. Is your religious preference Protestant, Catholic, or Jewish, or what?

☐ PROTESTANT (→ K39) ☐ 8. CATHOLIC ☐ 9. JEWISH OTHER ______________ (SPECIFY)

(TURN TO PAGE 3 OF COVER SHEET)

K39. What denomination is that? ______________________________

(TURN TO PAGE 3 OF COVER SHEET)

SECTION L: BY OBSERVATION ONLY

L1. Who was respondent (relation to Head)? ____________________

L2. Number of calls ____________________

L3. Is this address inside of the city limits of a city of 50,000 or more? (INTERVIEWER: CONSULT ROAD MAP IF NECESSARY)

1. YES

L4. What city is that?

____

L5. How far is this DU from the center of that city?

1. LESS THAN 5 MILES
2. 5-14.9 MILES
3. 15-29.9 MILES
4. 30-49.9 MILES
5. 50 OR MORE MILES

5. NO

L6. What is the nearest city of 50,000 or more? ____________________

L7. How far is this DU from the center of that city?

1. LESS THAN 5 MILES
2. 5-14.9 MILES
3. 15-29.9 MILES
4. 30-49.9 MILES
5. 50 OR MORE MILES

L8. Is this address inside the city limits of a city of 5,000 or more?

1. YES 5. NO

THUMBNAIL SKETCH

GLOSSARY

Some technical terms inevitably creep into the reporting of any large complicated research effort, and some deceptively common terms have meanings dictated by the procedures used. The interested reader is urged to refer to the series of documentation volumes describing this study as well as to the previous volumes of findings. The latter are all entitled Five Thousand American Families, while the documentation volumes are entitled A Panel Study of Income Dynamics, and have the following subtitles: Volume I, Study Design, Procedures and Available Data, 1968-72; Volume II, Tape Codes and Indexes, 1968-72; 1973 Supplement (Wave VI); 1974 Supplement (Wave VII); 1975 Supplement (Wave VIII); 1976 Supplement (Wave IX); 1977 Supplement (Wave X).

The 1978 Supplement, covering wave eleven, will appear concurrently with the present volume of findings, in spring 1979, but the findings from that wave will not appear until spring 1980.

All the data reported in this volume use weights to adjust for the original variation in sampling fractions (oversampling the poor) and for subsequent differences in panel attrition and the acquisition of non-sample spouses. Unweighted numbers of cases are given as indications of statistical stability.

ACHIEVEMENT MOTIVATION--A personality measure from social psychology representing a propensity to derive satisfaction from overcoming obstacles by one's own efforts in situations where the outcome is ambiguous. It is believed to be developed by early independence training, to result in the taking of calculated but not extreme risks and in the raising of goals after success experiences. It was administered in the 1972 interview.

ASPIRATION-AMBITION--A seven-item index of attitudes and plans reflecting attempts to improve economic well-being; see Volume II of the documentation, p. 789. The items include the following:

Might move on purpose
Wanted more work, and/or worked more than 2500 hours last year
Might quit a job if it was not challenging
Prefers a job with chances for making more money to one more pleasant
Is dissatisfied with self

376

Spends time figuring out how to get more money
Plans to get a new job, knows what type of job and what it might pay
(Second and last items neutralized for those for whom they are inappropriate.)

BETA (STANDARDIZED) COEFFICIENTS--When the independent and dependent variables in the regression equation $Y = a + b_1X_1 + b_2X_2 + u$ are measured in their "natural" units (e.g., in dollars, years, hours) then the parameters b_1 and b_2 reflect the effect on Y of a one unit change in X_1 and X_2, respectively. If all variables are standardized so that each has a mean of zero and a standard deviation equal to one, then the equation becomes $Y = \beta_1X_1 + \beta_2X_2 + v$ and the b's can be interpreted as the fraction of a standard deviation that Y changes as a result of a change of one standard deviation in the X's. The B's are regression coefficients (sometimes called "partial regression coefficients"), the β's are beta weights or standardized regression coefficients. The unstandardized and standardized coefficients are related in the following way:

$$\beta_1 = \frac{b_1\sigma_{x_1}}{\sigma_Y}$$

BETA^2--A multivariate measure of the explanatory power of a set of subclass means. It is the sum of squares attributable to a categorical predictor variable, after adjusting for the effects of other categorical predictor variables, relative to the total sum of squares of the dependent variable.

COGNITIVE ABILITY--See TEST SCORE

CONNECTEDNESS (to sources of information and help)--The following eight-item set of reported behaviors measuring the extent to which the respondent has friends or habits likely to keep him informed or provide help; see Volume II of the documentation, p. 793.

Attended PTA meeting within the year
Attends church once a month or more
Watches television more than one hour a day
Knows several neighbors by name (2 points if 6 or more)
Has relatives within walking distance
Goes to organizations once a month or more
Goes to a bar once a month or more
Belongs to a labor union and pays dues
(First item is neutralized for families without children).

COUNTY WAGE RATE for unskilled casual labor--An estimate of the wage rate for unskilled labor in the county where the respondent lives, secured by mail questionnaires sent each year to the state official in charge of unemployment compensation.

COUNTY UNEMPLOYMENT--An estimate of the unemployment rate in the county where the respondent lives, secured by mail questionnaires sent each year to the state official in charge of unemployment compensation.

COVARIANCE RATIO--The fraction of sample variance in a predictor variable which would be explained if that predictor were regressed on all other independent variables included in the regression.

CRAMER'S V--A measure of association between two nominal scale variables when they have no natural rank order. It is similar to the Chi-square measure except it is adjusted for the number of observations and is constrained to take on values between 0 and 1. The higher Cramer's V, the greater the association between the classifications.

DECILE--If all units are arranged in ascending order on some criterion such as income and each tenth marked off and identified, the ten groups formed are called deciles. The actual dividing points of incomes are given in the annual volumes of documentation.

DESIGN EFFECT--The effect of departures from simple random sampling in probability samples, defined as the ratio of the actual sampling variance to the variance of a simply random sample of the same size.

ECONOMIES OF SCALE--As the size of a family increases, if the costs do not increase proportionately, then we say there are economies of scale in large families.

ECONOMIZING INDEX--An index of six reported behaviors taken to indicate parsimonious use of money; see Volume II of the documentation, p. 790.

Spent less than $150 a year on alcohol
Spent less than $150 a year on cigarettes
Received more than $100 worth of free help
Do not own late model car
Eat together most of the time
Spent less than $260 a year eating out
(The fourth item is neutralized for those not owning cars).

EFFICACY INDEX--An index composed of six self-evaluations which reflect a sense of personal effectiveness, and a propensity to expect one's plans to work out;

see Volume II of the documentation, p. 787.

Is sure life will work out
Plans life ahead
Gets to carry out plans
Finishes things
Would rather save for the future
Thinks about things that might happen in future.

ELASTICITY--Refers to the response of the quantity of a good consumed to a change in price or in income. If the percentage change in the quantity of food consumed, for example, is greater than the percentage change in the price, then the demand for food is said to be price-elastic; if it is less than the percentage change in price, it is price-inelastic.

ETA^2--A measure of the explanatory power of a set of subclass means based on a one-way analysis of variance. It is analogous to the R^2 from regression analysis and measures the fraction of variance on the dependent variable which is explained by a single categorical variable.

EXOGENOUS VARIABLE--Variables whose levels and changes are determined by forces independent of those being studied, as contrasted with endogenous variables which are dependent upon variables in the system.

EXPECTED VALUE--When a dependent variable is determined by a combination of systematic and random effects, the expected value is that part which can be predicted from the systematic relationship. In the case of regression, it is the value predicted by the regression equation.

F-TEST--A test of the significance of the proportion of the variance explained by a set of several predictors or several classifications of a single predictor; see STATISTICAL SIGNIFICANCE.

FAMILY--All persons living in a household who are related by blood, marriage, or adoption. In occasional cases an unrelated person has been included in the family unit if he or she shares expenses and is apparently a permanent member of the unit. The definition of family used in this study includes single person families. This contrasts with the Census Bureau convention of classifying single persons separately as "unrelated individuals."

FAMILY COMPOSITION CHANGE--Contains several dimensions, most of them related to the family's position in the standard life cycle: marriage, birth of first child, youngest child reaches age six and starts school, children leave home, one spouse dies. The sex and marital status of the head, the number of children, and age of the youngest are the main components.

FAMILY MONEY INCOME--Family income, unless otherwise designated, is the total regular money income of the whole family, including income from labor, capital, and transfers such as pensions, welfare, unemployment compensation, workmen's compensation, and alimony received by all members of the family. It does not include capital gains (realized or unrealized), irregular receipts from insurance settlements, or in-kind transfers such as food stamp bonus values.

FAMILY TAPE--A data file containing all the data on that family from all ten interviews. There is one record for each sample family. The final ten-year data tape includes only families interviewed in 1977 so that there are no partial records. Where there are several families derived from an original sample family, the early family information will appear on each of their records.

HEAD OF FAMILY--In nuclear families the husband is defined as the head. In families with a single adult, that adult, regardless of sex. is defined as the head. In ambiguous cases of more than one adult, the head is the major earner or the one who owns the home or pays the rent. Note that the head of the family may change due to marriage, divorce, or death. For splitoff families, the head is similarly defined.

HOUSEHOLD--Probability samples usually sample occupied dwellings, which may contain more than one household, which in turn may contain more than one family. However, the term household is often used loosely to mean family, since the number of individuals living with unrelated adults is very small. A family is a group of individuals related by blood, marriage, or adoption.

HUMAN CAPITAL--The economically valued skills which result from the investment in one's self through education or other training.

IMPUTED RENT--A form of nonmoney income and consumption for home owners who can be thought of as in the business of renting a house to themselves. It is estimated by taking 6 percent of the owner's net equity in his house (house value minus remaining mortgage principal).

INCOME--Unless otherwise specified, this means total family money income including regular money transfers. (See FAMILY MONEY INCOME.) When a year is given, it is the year of the income, not the (later) year when the interview was taken.

INCOME/NEEDS RATIO--See NEEDS STANDARD

INDIVIDUAL TAPE--A data file with one record for each individual as of the current year, containing all the data for that individual over the whole period and all the data for the family that individual was in for each of the previous years since 1968. The tape contains some individuals who are not in the sample and are thus excluded from the analysis but who are necessary in order to derive family information for those in the sample. Individuals and families have separate weights; see WEIGHT and Volume I of the documentation.

INELASTIC--See ELASTICITY

INTELLIGENCE--See TEST SCORE

INTERRUPTION (OF WORK)--Any labor force withdrawal that is preceded and followed by periods of market work.

LABOR FORCE WITHDRAWAL--Any period of non-work activity of a year or more after age 18 or school completion.

LEAST SQUARES ESTIMATION--That method of estimation which minimizes the squared deviations of the actual value from the predicted value of the dependent variable. Such estimators are sensitive to extreme cases and nonnormal distributions.

LINEAR REGRESSION--See REGRESSION

MOTIVATION--See ACHIEVEMENT MOTIVATION

MULTICOLLINEARITY--A problem arising in estimation if two or more predictors are highly intercorrelated. It thus becomes difficult to estimate the separate effects of these variables.

MULTIPLE REGRESSION--See REGRESSION

MONEY EARNINGS ACTS INDEX--An index of behavioral reports that the family is doing things to increase its money income including working long hours, getting to work on time, changing jobs, looking for a better job (see Volume II of the documentation, p. 794).

MTR--Tables and other computer output are indexed by a Machine Tabulation Request number for checking and filing purposes. The number appears at the bottom of some tables.

NEEDS STANDARD--An estimate of the annual income necessary for a family to meet basic needs. The standard is generated in the same way as the official federal poverty line; food needs are determined according to age and sex, as estimated and priced by the USDA (in Family Economics Review), and food costs are adjusted for economies of scale; this figure is then multiplied by a factor to allow for other needs also differentially greater for smaller families. The needs standard, based on the "low-cost" food plan is 1.25 times the official federal poverty standard, which is based on the "economy" food plan.

The absolute level is to some extent arbitrary and is not adjusted for inflation in later years on the data file, although most analysis will include an inflation adjustment. The standard adjusts for differences in family size and structure so the status of families that differ in composition can be compared.

The needs standard is corrected for changes in family composition during the prior year, so that it is legitimate to compare it with the prior year's income. See Volume I of the documentation for further details.

NUMBER OF CASES (OBSERVATIONS)--The actual number of families or individuals on which the estimate is based. The number does not reflect the proportion of the population represented by that group because of the differences in sampling and response rates. See WEIGHT.

NULL HYPOTHESIS--See STATISTICAL SIGNIFICANCE

ORDINARY LEAST SQUARES (OLS)--See REGRESSION

QUINTILE--If all cases are arranged in ascending order on some criterion such as income and each fifth is marked off and identified, these five groups are called quintiles.

PARTIAL CORRELATION COEFFICIENT (partial R^2)--The partial correlation coefficient (squared) is a measure of the marginal or added explanatory power of one predictive variable or set of variables, over and above all the other predictors.

It can be thought of as the correlation of two sets of residuals, after removing the effects of all other predictors from both the dependent variable and the predictor in question. It is also the fraction of the remaining distance to perfect explanation (1.00) the multiple correlation (squared) is moved by the added predictor. It is the best measure of the "importance" of a predictor or group of predictors.

PERCENT OF POPULATION--The fraction of the weight-sum represented by a subgroup is an estimate of the percent of the population (of families or individuals) it represents. Aggregate estimates can be made by ratio-estimating procedures, i.e., multiplying the sample mean by the proportion of the population times an outside estimate of the aggregate number of families or individuals.

PLANNING INDEX--A subset of the efficacy index consisting of the following items:

Plans ahead
Prefers to save for future
Thinks about the future.

REAL EARNING ACTS INDEX--A five-item index, with neutralization of the inapplicable items, reflecting ways of earning nonmoney income or investing in self; see Volume II of the documentation, pp. 789-90.

Saved more than $75 doing own additions or repairs
Saved more than $75 growing own food
Saved more than $75 repairing own car
Head was taking courses or lessons with economic potential
Head spent spare time productively.

R^2--The fraction of sample variance in the dependent variable which is explained by the set of explanatory variables. The adjusted R^2 ($\bar{R}2$, R2 (adjusted)) shows the estimated fraction of the population variance in the dependent variable which is explained by the set of explanatory variables.

REGRESSION--A statistical technique which estimates the separate, independent effect of each of several predictors on a dependent variable. It minimizes the sum of the squared deviations from predicted values (see LEAST SQUARE ESTIMATION) and assumes that the dependent variable is a linear and additive function of the predictors and a random error term.

REGRESSION COEFFICIENT--The estimated effect of a predictor on the dependent variable obtained from a regression analysis. It shows the expected effect that a unit change in the predictor would have on the dependent variable if all other predictors were held constant.

RESERVATION WAGE--The minimum market wage which will entice a person to seek employment.

RISK AVOIDANCE INDEX--An index of six reported behaviors indicating the avoidance of undue risks; see Volume II of the documentation, p. 791.

Car (newest if several) in good condition
All cars are insured
Uses seat belts (2 points if all the time)
Has medical insurance or a way to get free care
Head smokes less than one pack of cigarettes a day
Have liquid savings (2 points if more than two months income in savings).

SIZE OF LARGEST CITY IN AREA--The primary sampling unit (PSU) is a county or (rarely) cluster of counties and the size of the largest city in that area is intended to reflect the number and variety of jobs, as well as differences in costs and standards of living. When the city is 50,000 or more, the area is a Census Standard Metropolitan Statistical Area.

SPLITOFF--A splitoff is someone who left a sample family and is living in a different household. Most splitoffs are children who left the parental home to set up their own households. When a couple is divorced, one of them is designated as the continuing family and the other is a splitoff.

STANDARD DEVIATION--A measure of the dispersion of a distribution of observations around their average (or predicted) value. If random effects are normally distributed, roughly two-thirds of the observations fall in a range of the mean plus or minus one standard deviation. It is equal to the square root of the variance and is denoted by the symbol σ. The standard deviations presented in the tables should be considered in the context of the design effect.

STATISTICAL SIGNIFICANCE--Traditional statistical inference tests the hypothesis that a finding (e.g., that some effect is greater than zero) is a chance result from the sample not existing in the population. If the probability is sufficiently small (e.g., less than 5 percent), this "null hypothesis" is rejected and it is believed that there is some effect which is statistically significant.

In most initial searching of data for what matters, and in what form, the assumptions of statistical testing are violated because many alternative models are tried. In addition, there are problems of estimating sampling variance with complex samples.

TEST SCORE--A 13-item sentence completion test developed as a culture-free, sex-free, and race-free measure of "intelligence." Of course, like all such measures, it may also test acquired skills or freedom from test anxiety. For further details, see Appendix F, Five Thousand American Families--Patterns of Economic Progress, Vol. I, p. 381-5.

TRAINING, FIRM-SPECIFIC--On-the-job training acquired with one's present employer that provides skills which are useful only for the present employer.

TRAINING-GENERAL--On-the-job training that provides skills which are useful to more than one employer.

TRUST IN OTHERS--An index composed of five self-evaluating items on trusting others, believing in the fairness of the system; see Volume II of the documentation, p. 788.

Does not get angry easily
It matters what others think
Trusts most other people
Believes the life of the average man is getting better
Believes there are not a lot of people who have good things they don't deserve.

T-TEST--Under certain assumptions, estimated regression coefficients have a frequency distribution known as the t-distribution. This fact can be used to form a test of significance for the coefficients, called the t-test. See also STATISTICAL SIGNIFICANCE.

WEIGHT--There are weights both for the file of individuals and families which make the weighted estimates representative of the national non-institutional population of the continental United States. They offset differences in sampling rates and response rates, and the extra probabilities of inclusion of those who married nonsample members. There will be more respondents in lower income and minority groups than the weighted proportions because of oversampling. The oversampling simply makes the estimates for those groups more reliable.

Weighted estimates essentially multiply each case by a number representing the number of households it represents. Each digit of the weight represents 500 households.

WIFE--A legal wife; a female friend who has lived with a male head for a year or more.

YEAR--Interviewing was done in the spring of each year from 1968 through 1978, but the income questions refer to each previous year (1967-1977).